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ABSTRACT

A research study examined the factors that will affect future educational programs and the resultant effect of these factors on future school facilities. Additionally, the study developed an architectural program for future educational facilities based upon the anticipated educational specifications and determined the underlying themes concerning the development of future education facilities. Surveys were sent to architects, futurists, and educators to gain a reasoned consensus on the factors involved. Following survey rounds, the participants were given either qualitative or quantitative feedback to generate a higher order of responses and group consensus. Findings indicated 28 probable social or technological futures that may affect education. Also revealed were 12 major themes concerning the effect of these futures on school architecture. Each theme has supporting architectural considerations that could be incorporated in future school facilities. Recommendations for other researchers are noted. An appendix, comprising over half the document, includes the survey instruments used in the study. (Contains 132 references.) (GR)

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ARCHITECTURAL CONCERNS
FOR
FUTURE LEARNING ENVIRONMENTS

by

Kelvin Loren McMillin

A DISSERTATION

Presented to the Faculty of

The Graduate College in the University of Nebraska

In Partial Fulfillment of the Requirements

For the Degree of Doctor of Philosophy

Major: Interdepartmental Area of Administration,
Curriculum and Instruction

Under the Supervision of Professor Ward Sybouts

Lincoln, Nebraska

April, 1994

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ARCHITECTURAL CONCERNS

FOR

FUTURE LEARNING ENVIRONMENTS

Kelvin Loren McMillin, Ph.D.

University of Nebraska, 1994

Advisor: Ward Sybouts

An overriding principle of architecture is "form ever follows function." With this principle, the design of a school facility should reflect the educational program housed within it. The function of most buildings is fixed or static. However, in education, evolving curricula and programs make the function more dynamic, often resulting in dramatic changes in purpose during the life span of the building. Given the fixed nature of facilities, the evolving nature of school programs and the financial commitment required for new facilities, school structures must be designed with future function and form in mind.

Research on future school facilities is limited, dated in nature, or reflects a singular point of view. A reasoned, expert, group consensus regarding future educational programs and facilities is needed to assist local school districts in making future facility decisions.

This research was undertaken to develop a reasoned group consensus as to factors which will effect future educational programs and the resultant effect of these factors on future school facilities. This study consisted of administering an iterative, five round survey instrument to a reputationally elite group of architects, futurists, and educators. A modified Delphi process was the basis for administering the study and developing the survey instrument.

The subjects in this study were divided into two sample groups. The first group responded to the first two survey rounds concerning social and technological futures for education. The second sample group responded to survey rounds three through five, concerning the effect of social and technlogical futures on future school facilities. Following survey rounds, the participants were given either qualitative or quantiative feedback for the purpose of generating higher order responses and group consensus.

The findings of this study indicate twenty-eight probable social or technological futures that may effect education. In addition, the study findings indicate twelve major themes concerning the effect of these futures on school architecture. Each theme has supporting architectural considerations that could be incorporated in future school facilities. Recommendations for other researchers are noted.

DEDICATION

This work is dedicated to the memory of my twin sister, Karen, who God chose to take from this world at an early age. A woman of wonderful dreams and aspirations, she accomplished much in her brief lifetime. A Summa Cum Laude graduate, All-American athlete, and loving sister, I know that her greatest dream still lives, her children. For all that knew her and were inspired by her, she truly was a gift from God. Thanks, Sis.

ACKNOWLEDGMENTS

There are several individuals who through the years have profoundly effected my hopes, dreams and ultimately my accomplishments. To each of these people I extend my gratitude for their unique gifts. . .

. . . to Kelly McMillin, my wife and muse, for understanding and accepting my many absences and the loss of so many precious moments together;

. . . to my parents, Fred and Vivian McMillin, for their life-long unconditional love and support;

. . . to my high school coaches, Lonnie Franklin and Clark Wille who years ago convinced a young boy to believe in the impossible, or at least the very improbable;

. . . to my close friends, Phyllis Hasse and Margie Lawson, who always saw the silver lining of every cloud;

. . . to Luise Berner, for her patience in editing this study, but above all for a wonderful friendship;

. . . to my aunt, Florine Moore, who for years has cared enough to introduce me as her good looking nephew the doctor, at least now she is half right;

. . . to Vickie Hobbs, who kept me focused and provided invaluable assistance in the development of a computer sorting system for data analysis;

. . . to Dr. Richard Farmer of Southeast Missouri State University, my mentor and friend during my master's program, for first suggesting that I continue my education;

. . . to the many professors in the Department of Educational Administration at the University of Nebraska-Lincoln, who collectively nursed a 'wannabe' eagle from fledging to initial flight;

. . . to Dr. Cale Hudson, who took the extra time and made the extra effort to see that this Missouri transplant felt at home in Big Red country;

. . . to Dr. Marilyn Grady, my mentor, who by example and committment, helped me understand what leadership was;

. . . to Drs. Miles Bryant, William Sesow and Homer Puderbaugh, members of my committe, for their expertise, advisement, and infinite patience; and

. . . to Dr. Ward Sybouts, my doctoral advisor and friend, a truly wonderful person, who until now may never have known how much I valued his experience, knowledge, and companionship. God blessed me the day I was introduced to Susie and you.

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CHAPTER 1

Introduction

Context of the Problem

American architect Louis Sullivan once stated, that "form ever follows function," a principle which still permeates architectural planning today, almost a century later.[1] In essence, Sullivan asserted that the design or form of a building must logically be based upon the activity housed within it (the function). In most cases, such as a residential structure, the function of the building has a primarily established purpose. The minor changes that do occur are widely accepted and based upon the evolutionary and cyclical stage of the family's development (newlywed, nursery, adolescents, the empty nest, and retirement). However, in education, the almost revolutionary changes in curricula and programs have made the function of the school more dynamic, often resulting in dramatic changes during the forty to ninety year life span of the building.

During the past twenty years, changes in school programs and philosophies such as education of the handicapped, disadvantaged and gifted; equality of the sexes, computer technology and even state mandated teacher/pupil ratio "ceilings" have resulted in vastly changed and overcrowded buildings in many districts. Consequently, facilities designed and constructed only twenty years ago, though adequate to house then existing enrollments, are often inadequate to house today's evolved school programs. Leaders in the Education Writers Association suggest that at least 25 percent of this nation's school facilities fall into this category, which they describe as " inadequate, crowded, and shoddy."[2] In addition, they suggested that 33 percent more will soon become inadequate as enrollments continue to increase. Due to the evolving school programs and services, the lengthy life span of the typical school building, and the substantial fiscal commitment required from the community for remodeling or new construction, school structures must be designed with the future of function and form in mind.

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[1] Louis Sullivan, "The Tall Office Building Artistically Considered," Lippincotts Magazine, Volume 57, 1896: 403.

Educational Specifications.

Typically, the creation of a school building has three major steps: (1) the development of educational specifications (architectural programming), (2) the development of architectural drawings or plans based upon these specifications (architectural design), and (3) the actual construction of the building utilizing the architect's plans.[3]

The development of educational specifications (one part of architectural programming) is an organized process of inquiry whereby problems concerning function, form, economy, time, and energy are defined. The inquiry procedure is based upon a five step process; the establishment of goals, the collection and analyzation of facts, uncovering and testing concepts, determining specific needs, and stating the problem.[4] When based upon the context of public education, architectural programming results in a comprehensive set of written physical, educational, and community requirements which are representative of the educational aims of the school district.

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[2] Wolves at the Schoolhouse Door: An Investigation of the Condition of Public School Buildings (Washington, D.C.: Education Writers Association, 1989), 1.

[3] N.L. Engelhardt, N.L. Engelhardt, Jr., and Stanton Leggett, School Planning and Building Handbook (New York: F.W. Dodge Corporation, 1956).

[4] William M. Pena, with William Caudill and John W. Frocke, Problem Seeking- An Architectural Programming Primer (Boston: Cahners Books International Inc, 1977) 12-13.

Originally, the development of educational specifications was performed by the architect. Through time, this was changed to include both the superintendent and the architect, and eventually the advice of the board of education was added to the process. Recently, the trend in educational specifications has been development by a committee of local teachers, administrators, school board officials, educational consultants, and townspeople.[5] To date, the committee process of developing educational specifications, often termed "cooperative planning"[6] or "participatory design,"[7] has generally reflected a local perspective. The committee process, which can restrict insight by limiting input from sources external to the community, often results in facilities traditionally designed and programmatically adequate for a few short decades.

The development of social, economic, political, and technological changes, plus the accessibility of information bases has led to a society exponentially changing. The explosive expansion of knowledge and information represents a dilemma to persons charged with designing school buildings, how to determine accurate educational specifications for the design of future school facilities particularly in times of increasing societal change. School buildings traditionally designed to meet local perspectives of the future may quickly become inadequate as local perceptions of future needs become overrun by societal change on the local, national, and global level.

The process of developing educational specifications may evolve once more, expanding the number of decision makers from the architect, superintendent, board of education, and local school committee to include a panel of national experts from various disciplines, all focused on the future needs of educational buildings. Perceptions from such a diverse group, with differing locations, disciplines, and backgrounds may become necessary, as the common individual or local committee may not have the required expertise and future perspective to accurately forecast general educational facility needs. Facility planning for the future requires accurate perceptions of future enrollments, curricula, society, and programs; careful consideration of how these futures impact school facilities, and most of all involvement beyond one or two decision makers.[8]

---

[5] Donald J. Leu, "The Changing Planning Process,"The Council of Educational Facility Planners Journal 16, no. 5 (1978): 11.

[6] "Cooperative Planning Primer," The Council of Educational Facility Planners Journal (CEFP Journal Special Report, 1981): 1-7.

[7] Aase Eriksen, "Participatory Design in Grand Rapids: Second Generation Planning," The Council of Educational Facility Planners Journal 17, no. 4 (1979): 18-21.

Future Educational Programs and School Facilities

The debate over future curricular programs and services has been lengthy and comprehensive (Peterson,[9] Goodlad,[10] Robinson,[11] Hack,[12] Goodlad,[13] Suppes,[14] Tyler,[15] Cetron,[16] Cetron and Gayle,[17] United Way of America,[18] Perelman[19]).

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[8] Basil Castaldi, Educational Facilities: Planning, Modernization, and Management (Boston: Allyn and Bacon Inc., 1987).

[9] A.D.C. Peterson, The Future of Education (London: The Cresset Press, 1968)

[10] John I. Goodlad, The Future of Learning and Teaching. An Occasional Paper of the Center for Study of Instruction. (Washington: National Education Association, 1968)

[11] Thorington P. Robinson, The Implications of Selected Educational Trends for Future School Systems (Santa Monica: System Development Corporation, 1968).

[12] Walter G. Hack et al., Educational Futurism 1985 (Berkeley: McCutchan Publishing Corporation, 1971).

[13] John I. Goodlad, "A Concept of School in the Year 2000 A.D." in Foundations of Futurology in Education, ed. Richard W. Hostrop (Homewood, IL.: ETC Publications, 1973), 213-228.

[14] P. Suppes, "The School of the Future: Technological Possibilities," in The Future of Education: Perspectives on Tomorrow's Schooling, ed. L. Rubin (Boston, MA: Allyn and Bacon, Inc. 1975) 145-147.

[15] Ralph W. Tyler, "The School of the Future: Needed Research and Development," in The Future of Education: Perspectives on Tomorrow's Schooling, ed. L. Rubin (Boston, MA: Allyn and Bacon, Inc. 1975), 165-180.

However, until recent years, literature linking future school programs and appropriately designed school facilities has been dated (Harrison and Dobbin,[20] Educational Facility Laboratories,[21] Council of Educational Facility Planners[22,23]) or limited to a singular or specific educational program (McVey,[24] Sullivan,[25] Chase[26]). Though the changing trends in school architecture, brought about by new school programs, have been well

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[16] Marvin J. Cetron, Schools of the Future: How American Business and Education Can Cooperate to Save Our Schools (New York: McGraw-Hill Book Company, 1985).

[17] Marvin J. Cetron and Margaret Evans Gayle, "Educational Renaissance: 43 Trends for U.S. Schools," Educational Renaissance: Our Schools into the Twenty-First Century (Bethesda, Maryland: St. Martins Press, 1990).

[18] United Way of America, What Lies Ahead: Countdown to the 21st Century (Alexandria, Virginia: United Way of America, 1990).

[19] Lewis J. Perelman, Schools Out: A Radical New Formula for the Revitalization of America's Educational System (New York: Avon Books, 1992).

[20] W.K. Harrison and C.E. Dobbin, School Buildings of Today and Tomorrow (New York: Architectural Book Publishing Company, Inc., 1931), 3.

[21] The Schoolhouse in the City (New York: Educational Facilities Laboratories, 1966).

[22] "New Trends in Education," The Council of Educational Facility Planners Journal 8, no. 5 (1970): 7-14.

[23] "More New Trends in Education," The Council of Educational Facility Planners Journal 10, no. 4 (1972): 7-10.

[24] G.F. McVey, "Designing Environments for Effective Media Utilization," The Council of Educational Facility Planners Journal 14, no. 3 (1976): 7.

[25] Molly Sullivan, "Facilities for Gifted Students," The Council of Educational Facility Planners Journal 19, no. 6 (1981): 11.

[26] William W. Chase, "The Federal Influence: Initiatives and Implications Affecting Planning and Designing of Public Schools," The Council of Educational Facility Planners Journal 20, no. 2 (1982): 4-7.

documented by Hill,[27] Phillips,[28] Tollerud,[29] and Brubaker,[30] an obvious relationship to a future perspective has been limited. Fortunately, the growing national need for new or renovated school facilities has led to a recent resurgence in future school facility research.

Brubaker, one of the more prolific writers on future educational facilities, cited several design trends that he felt would be incorporated in future school facilities, including: career education centers, child care centers, "great spaces," a return to pitched roofs, and the renovation of industrial buildings as school facilities.[31,32] McInerney foresaw future schools as buildings designed to enhance the capabilities of technology, particularly through the computer networking of the school, community, and home.[33] In addition, sensitivity to electronic learning, commons areas, community use, handicap access, shared learning spaces, learning centers, and cost-effectiveness have all been noted as recent design trends for future school facilities.[34,35] The California State Department of Education has suggested that school facility planners will need to take into consideration the following programming concerns when designing future school facilities:

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[27] Robert Hill, "School Architecture: New Activities Dictate New Designs," The Council of Educational Facility Planners Journal 22, no. 2 (1984): 4-5.

[28] Joanne B. Phillips, "Updated Classrooms for Updated Curriculum," The Council of Educational Facility Planners Journal 24, no. 2 (1986): 8-9.

[29] Guy Tollerud, "Changing Patterns of School Design," The Council of Educational Facility Planners Journal 7, no. 4 (1969): 7-8.

[30] C. Williams Brubaker, "Trends in the Planning and Design of School Facilities," The Council of Educational Facility Planners Journal 19, no. 6 (1981): 4-8.

[31] C. Williams Brubaker, "These 21 Trends Will Shape the Future of School Design," American School Board Journal, April 1988: 31-36, 66.

[32] C. Williams Brubaker, The Future Outlook for School Facilities Planning and Design (ERIC, ED 261 469, 1985), 1-13.

[33] William D. McInerney, "Potential Impacts of Educational Futures on Educational Facilities," Council of Educational Facility Planners Journal, December, 1987: 25-26.

1. the use of a variety of instructional methods,
2. the student use of manipulative materials in learning,
3. increased collegiality and professionalism among teachers,
4. more services for children at risk of failure,
5. preschool and before- and after-school care,
6. community use of facilities (including non-school functions),
7. optimum school size,
8. increased parental involvement,
9. appropriate use of technology in curriculum and assessment,
10. year round education, and
11. buildings that are modular /flexible.[36]

Finally, the Committee on Architecture for Education has suggested future program offerings will require an educational facility designed around access, security, and flexibility.[37]

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[34] C. William Day and Robert Moje, "Smart Schools for the Next Century," Learning by Design (Alexandria VA: National School Boards Association, March 1993), 2-3.

[35] C. William Day and Robert Moje, "Enhancing Learning Through Design," Learning by Design (Alexandria VA: National School Boards Association, April 1992), 2-3.

[36] California State Department of Education, Schools for the 21st Century (Sacremento, CA: California Department of Education, 1990).

[37] Heather Paul Kurent and Robert L. Olsen, Architecture-Related Concerns for Future Learning Environments (Washington D.C.: The American Institute of Architects Committee on Architecture for Education, 1990).

as recent design trends for future school facilities.[34,35] The California State Department of Education has suggested that school facility planners will need to take into consideration the following programming concerns when designing future school facilities:

1. the use of a variety of instructional methods,
2. the student use of manipulative materials in learning,
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[37] Heather Paul Kurent and Robert L. Olsen, Architecture-Related Concerns for Future Learning Environments (Washington D.C.: The American Institute of Architects Committee on Architecture for Education, 1990).

The Delphi Process

To adequately prepare the nation's new school structures for an evolving era, a method must be used to systematically solicit, collect, and evaluate independent expert opinion from various locations. With the exception of the 1990 Children, Learning, and School Design National Conference, national experts have rarely met to discuss school facilities.[38] Traditional methods of gathering educational specifications for school architecture (that being school surveys and local committees) could be expanded to include group involvement procedures such as the Delphi process. The Delphi process allows experts from different locations and disciplines to interact anonymously on increasingly relevant information, ultimately reaching some degree of consensus without direct confrontation.[39] Jones described the Delphi process:

> Delphi systematically elicits and compares the opinions of experts concerning specific events, trends, problems or other aspects of the future. Panel members, who are not known to each other, respond to questionnaires in a series of rounds. After a round, each panelist may be supplied with information about the forecasts made by the others. In view of this information, panelists may decide to change their own forecasts. Thus Delphi, which proceeds through rounds of feedback to panelists and is conducted by interlocutors who serve as editors, blends genius forecasting with a more rigorous, formalized approach.[40]

Specifically designed to provide reasoned group judgement for comprehensive, long range, and future planning, the Delphi process has been a prominent futures research method.

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[38] American Institute of Architects, Children, Learning, and School Design: A National Invitational Conference for Architects and Educators. Evanston Ill: Northwestern University, November 16-18, 1990.

[39] William G. Cunningham, Systematic Planning for Educational Change (Mountain View, CA: Mayfield Publishing Company, 1982), 130.

[40] Thomas E. Jones, Options for the Future: A Comparative Analysis of Policy-Oriented Forecasts (New York: Praeger Publishers, 1980).

The use of the Delphi technique in school planning is unusual, but has been utilized previously. McClanahan used a modified Delphi methodology to develop a group consensus as to future school programs and services.[41] McClanahan's research has particular relevance to this study since the determination of proposed programs and services is often a first step in the development of educational specifications for facility planning.

Through the use of the Delphi process, deficiencies in development of future educational specifications may be rectified, the knowledge base for educational facility futures may be augmented, a more accurate perception of the needs and design of future school facilities may be produced, and school facilities more appropriate and adequate for future needs may result.

The Research Paradigm

This study was designed to utilize a qualitative research approach with a traditionally quantitative research tool, the survey instrument. By using a qualitative approach, certain assumptions were made concerning the research method, the role of the researcher, and the field to be studied.

Three important aspects of the qualitative research method made it particularly appealing for this research in educational facility planning. Qualitative research assumes a goal of understanding, discovery, description, or hypothesis generation.[42] The future of educational facilities has been a field of limited literature and even fewer propositions or hypotheses. The discovery and description of probable facility futures should lend impetus to the development of further research and hypotheses in this area. In addition, qualitative research permits the sampling of participants in a nonrandom fashion and with a small sample size.[43]

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[41] Randy Rae McClanahan, "The Development, Utilization, and Analysis of a Normative Futures Research Method in a K-12 Educational Facilities Survey" (Ph.D. diss., University of Nebraska-Lincoln, 1988).

[42] Sharan B. Merriam, Case Study Research in Education: A Qualitative Approach (San Francisco: Jossey-Bass Inc., 1988), 18.

This research project was designed to utilize a small, nonrandomized sample of national futures experts in the study of future educational facilities. In a research project studying the responses of an elite group of national experts, randomization and a large, nationally representative sample would be self defeating. Finally, qualitative research assumes the analysis of data by inductive methods, with the researcher building theoretical relationships, categories, or hypotheses from the data collected, and not testing preconceived theory.[44] Again, in a field where few theories have been developed, such as educational facility futures, this was an ideal complement.

The assumption in qualitative research is that the researcher is the primary instrument of data gathering, usually by interviews or observations.[45] In this Delphi research study, the data gathering method was a survey instrument. However, the researcher was the editor and disseminator of each successive round of surveys. Though the researcher was not the primary instrument of data gathering, he was still the primary means of assembling, managing, and interpreting data; thus Delphi and qualitative research were compatible.

Though the requirements for classroom square footages can be standardized, the architecture of a school building is a reflection of the school's educational philosophy and curriculum, and as such, no universally accepted standards exist. The assumption is made that no fixed structure such as a school building can adequately match the school's educational needs forever. However, through proper planning and foresight, a building can be designed which will properly house the educational mission of the school, and do so for a longer time before programmatic or curricular obsolescence.

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[43] Walter R. Borg and Meredith D. Gall, Educational Research (New York: Longman Inc., 1989), 386.

[44] Merriam, op. cit., p. 20.

[45] Borg and Gall, loc. cit.

Statement of the Problem

The planning and design of school facilities appropriate for future school programs and services is a difficult task. School facilities planned with traditional methods and relationships often result in facilities functionally outmoded in twenty years but built to last for seventy. The planning of appropriate school facilities requires an accurate perception of future educational needs and purpose. The use of a group interaction and consensus technique such as the Delphi process, when focused upon the problem of future educational programs and facilities, will strengthen the knowledge and information base between school administrators, architects, and decision makers. Therefore, the design of newly constructed educational facilities will be made more appropriate to the school's future educational functions, and school facilities will be programmatically appropriate for a longer period of time before obsolescence.

Purpose

This research was undertaken for the purposes of (1) developing a list of anticipated societal or environmental factors which may impact education and future educational facilities; (2) determining, based upon these anticipated societal or environmental factors, probable educational specifications (characteristics) for future educational facilities; (3) developing an architectural program for future educational facilities based upon the anticipated educational specifications; and (4) determining underlying themes concerning the development of future educational facilities.

This research was not undertaken for the purpose of developing a 'recipe' by which all future educational facilities would be designed identically. Instead, this research was designed so that the results could be used as a basis for initial dialogue between architects, educators and decision makers as they determine specific future educational needs and facilities on the local level.

The Research Questions

Based upon the foregoing discussion of the impact of societal and future change on educational facilities, the researcher sought explanations and descriptions to the following questions:

1. What are the major societal, technological and environmental factors which will impact education in the future?

2. What effect will these factors have on future educational facility needs?

3. What will be the educational specifications (characteristics) for school facilities of the future?

4. What characteristic themes underlie future educational specifications and what impact might they have on the architectural design of future school facilities?

Definitions

Following are those terms used in this dissertation needing specific definition:

Architectural Design. The creative and interpretive application of the architectural program into a building solution that meets the needs of the client. "Design is problem solving. Design is architectural synthesis."[46]

Architectural Programming. "A process leading to the statement of an architectural problem and the requirements to be met in offering a solution. Programming is problem seeking. Programming is architectural analysis."[47]

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[46] William M. Pena, with William Caudill and John W. Frocke, Problem Seeking-An Architectural Programming Primer (Boston: Cahners Books International Inc, 1977), 15.

[47] Ibid., 14-16.

Architectural Program. "The program is a formal, written communication between designer and client in order to determine that the client's needs and values are clearly stated and understood. It provides a method for decision making and a rationale for future decisions."[48]

Delphi process. The Delphi process "is a method to systematically solicit, collect, evaluate and tabulate expert opinion without group discussion."[49]

Futurists. Those actively involved in the practice of prediction or forecasting.

Educational facilities (school facilities, school buildings). Any structure used by a school district to house students, staff, programs, services, or equipment.

Educational facilities architecture. The science and art of developing school facilities, in accordance with principles determined by aesthetic, practical, material, or educational considerations.

Educational facilities design. The process and product of solving the architectural problem of how to produce a structure which will adequately meet the requirements of the school's educational mission.

Educational facilities planning. A process for "making present decisions based upon their future impact."[50] "To determine appropriate future action through a sequence of informed choices."[51]

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[48] Henry Sanoff et al., Methods of Architectural Programming (Stroudsburg, Pennsylvania: Dowden, Hutchison and Ross, 1977), 4.

[49] Richard G. Tersine and Walter E. Riggs, "The Delphi Technique: A Long Range Planning Tool," Business Horizons 19, no. 2 (April 1976): 51.

[50] Cunningham, op. cit., 245.

[51] Gerald Nadler, The Planning and Design Approach (New York: John Wiley & Sons, 1981), 45.

Educational specifications. The clear and precise description of "the various learning activities to be housed in the school, their spatial requirements and special features."[52] The general characteristics of a school structure necessary to adequately house the educational program. The assumption is made that educational specifications are included in and are an integral part of an architectural program for a school facility.

Exploratory futures research methods. Research methods "based upon methodical and relatively linear extrapolation of past and present developments into the future."[53]

Future. For the purpose of this study, any period of time "five to fifty years ahead" of the present.[54]

Futures research. The methodical exploration of the range of alternative futures. The "nonmystical efforts to identify, analyze, and evaluate possible future changes in human life and the world."[55]

Normative futures research methods. Research methods that "prescribe what the future should or should not be like and then delineates paths for reaching or avoiding the selected future."[56]

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[52] Basil Castaldi, The Creative Planning of School Facilities (Chicago: Rand McNally & Company, 1969), 143.

[53] Jib Fowles, ed., Handbook of Futures Research (Westport: Greenwood Press, 1978), 9.

[54] E. Cornish, The Study of the Future: An Introduction to the Art and Science of Understanding and Shaping Tomorrow's World (Washington, D.C.: World Future Society, 1977), 99.

[55] Ibid., 155.

[56] Jones, op. cit., 21.

Strategic/long-range educational facility planning. "A synergistic planning effort that incorporates the identification of future educational facility needs with the development of strategies and plans for accommodating those needs."[57]

Assumptions

The following assumptions were held as true for the purpose of this study:

1. There is an identifiable relationship between educational programs or services and the building required to house such programs and services.

2. The educational specifications (characteristics) of future educational facilities can be hypothesized to a degree of accuracy which permits appropriate strategic/long-range facility planning.

3. An individual does not need formal architectural training to determine the implications of educational futures to educational facility specifications.

4. An individual does not need formal architectural training to determine the characteristics (educational specifications) necessary for future educational facility design.

Delimitations and Limitations

This study was restricted by the following delimitations:

1. This study addressed future effects of social, economic, and technological factors on school programs and the educational specifications of school facilities.

2. Participants in this study were individual volunteers recognized in their specialized disciplines as futurists or future thinkers.

This study was subject to the following limitations:

1. The empirical results of this study were representative of those members involved in the study. Though the individuals involved represented diverse disciplines and

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[57] McClanahan, op. cit.

geographic locations, they were not randomly sampled, therefore, the results may not be generalizable to the larger school community.

2. The instrument content was situation specific.

3. This study was subject to those weaknesses inherent in survey research.

Significance of the Study

The results of this study will provide substantive and empirical evidence regarding the future of educational facilities. This study will utilize a qualitative research philosophy with a normative futures research method (Delphi) in collecting necessary information for an architectural program for future school facilities. This research method will depart from and advance traditional singular or community based methods of educational facility planning.

This study represents a significant methodological change in how educational facility planning is viewed. With the exception of McClanahan, no study was found that utilized the Delphi technique in the planning of school facilities. This study significantly extended McClanahan's[58] study of future school programs in two fashions: it utilized a national panel of futures experts as participants instead of a local school district strategic planning committee, and it extended the nature of the study from future program offerings to include their architectural needs and effects.

The results of this study will provide the educational community with a base from which the current methods of developing educational specifications will be expanded to include the Delphi process and national futures experts. Further, this study will provide the architectural community with an alternative to their current methods of architectural programming. Finally, this study's results will provide a knowledge base from which school facilities may be designed to more adequately house future programs before obsolescence. With the growing need for educational facility renovation or construction and the increasingly changing technological and sociological environment, this study was both timely and highly desirable.

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[58] McClanahan, op. cit.

Procedures

The first component in the sequence of procedures undertaken in this study was a review of literature to determine the theoretical bases for and practical applications in the fields of educational facility architecture, architectural programming, strategic planning and futures research. The second component was a study of the compatibility of qualitative research methodology to the research topic. The third component was the development of the various survey instruments utilized in the study. The fourth component was administration of a pilot study. The fifth component was administration of the study. The final component was analysis and presentation of the collected data.

CHAPTER 2

Review of Literature

Literatures pertaining to the fields of educational facility architecture, architectural programming, predicted futures for educational facilities, strategic planning, and futures research were reviewed for this study. The purpose for conducting this review was to develop historical and theoretical perspectives concerning educational facility architecture and futures research, with particular emphasis on the practical application of these fields in the study of future school facilities.

The Evolvement of Educational Facility Architecture

To fully comprehend a situation, one must become "immersed" within it. As a basis for considering the future of school architecture, it helps to understand the evolvement of its past to its present. Historically, the architecture of a school facility closely parallels the educational philosophy of the time. Through the centuries, changes in educational and architectural philosophies have evolved school buildings from mere shelters to protect a teacher and students from the elements, to today's specialized educational structures specifically designed to meet student's physical, psychological, social, emotional, and intellectual needs. The changes in school buildings have certainly been influenced by several kindred evolvements: the change in educational practice from education of the few and privileged, to education for the masses regardless of sex, race, or handicap; the development of school instruction as a physiological and psychological science; and based upon the belief that form follows function, the development of school architecture as a separate vehicle of expression from traditional architecture.

To thoroughly understand the development of school architecture, the school facility and its educational function must be studied from a historical perspective. Given the relative youth of the the United States as a nation, one cannot help but first acknowledge the "roots" of American education, ancient Greece and Europe. This review of school architecture starts with the advent of formalized schooling, ancient Greek civilization. The review then focuses on European school architecture of the fifteenth and sixteenth centuries. Finally, American education and schools will be described from the seventeenth century forward.

Ancient Greece and Rome

During the five hundred years before Christ, the Greek and Roman Empires produced massive, stone Doric buildings. During the Hellenistic period, these buildings often held public functions as municipal offices, courts, and chambers. Later, during the Roman Empire these magnificent structures would be built to house large open areas for public assembly.[1] In both of these societies, the school was not considered to be housed in a formal building. The Greek "school" was any place that a teacher met with his pupils, usually sheltered by one of the public buildings, but in the open air.[2] Roman classes were often held in eclectic places such as booths, sheds, houses, or under a portico.[3] The practice of education at this time was one of preference, citizenship, and sex. Education was considered a private concern of the family and open to males only; and in Greek society, a man who had not been educated could be denied full citizenship. However, the ancient Greeks and Romans were not without a contribution to school architecture. The "palaestra" or gymnasium, was a formal structure which boys reported to for gymnastics instruction, as such it represents an explicit educational space and function still popular today in the twentieth century.[4]

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[1] Michael Raeburn, Architecture of the Western World (New York: Rizzoli International Publications, 1980), 61.

[2] Basil Castaldi, Educational Facilities: Planning, Modernization, and Management (Boston: Allyn and Bacon Inc., 1987), 8.

[3] Russell Sturgis, History of Architecture (Doubleday Publishing Company, 1916),142.

Fifteenth and Sixteenth Century

The fourteenth and fifteenth centuries represent an interval of time often called the "revival of learning." With the development of the printing press and paper, books would finally become accessible to a widespread audience of scholars. Teaching methods would change from teacher lectures to a textbook mode. Royalty would vie for the newest book in print. Collecting of books gained prominence and libraries soon formed. The classroom architecture of this period would remain prevalent, particularly in rural areas, for centuries. Gone was the "informality" of the Greek school, to be replaced by a formalized curriculum and schoolhouse. It was characterized by fixed benches and tables, placed in rows with a teacher's desk in the front of the classroom on a small platform.[5] Lighting was poor, and what little heating there was came from a fireplace at one end of the classroom, so that in the winter those closest to it would sweat, while those furthest away would shiver.

Seventeen and Eighteenth Century

Seventeenth century America was a country still in development. Immigrants, starting a new life in a new land, and a lifestyle based upon an agrarian economy, left little time for unnecessary activities. This was reflected in the educational facilities of the time. School buildings were simple, utilitarian, predominantly one room in size, built of whatever materials were easily available, and had no distinguishing architectural style, save that of a large room with a fireplace at one end and windows at the other.[6] Knight describes the typical school of this era:

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[4] Castaldi, op. cit., 10.

[5] Elwood P. Cubberly, The History of Education (New York: Houghton Mifflin Co., 1948), 278.

> The early American schoolhouses were neither charming nor comfortable, and most of them were located in surroundings inviting to neither the body nor the mind. . . . Generally, the schoolhouses in rural districts were located in waste and wild spots which the plow had deserted to broom, sedge and rabbits. The records abound in accounts of ugly cheerless places as school sites.[7]

Seventeenth-century American schools were usually one-room school structures with benches and long tables for the pupils and a raised podium for the teacher. However, seventeenth century American schools did represent some progress in design over their Greek and Roman counterparts, they did have their own separate building and specialized furniture. Nonetheless, in comparison to the majestic Greek "palaestra" and to the formality of the sixteenth century European schoolhouse, American schoolhouses would be considered primitive.

Castaldi described some of the conditions existing at the end of the seventeenth century that would effectively stagnate the development of new American architecture (including school architecture) during the eighteenth century:

> For the most part, early American architecture followed whatever was in vogue in England at the time. The lack of trained architects, the inexperience of builders in working with classical forms, and the necessity of using wood and bricks instead of stone produced an architecture that was interesting but undistinguished.[8]

During the eighteenth century, American school architecture would reflect a period of simplicity and utility but not progress. The deplorable condition of the seventeenth century one-room schoolhouse would be destined to continue in most rural areas as no conceived need for change existed. In neither the seventeenth nor eighteenth century, did the school building become a specialized or distinct architectural entity. However, with continued immigration and the gradual shift from a predominantly agrarian economy to a more urbanized nineteenth century society, the increase in city populations would ultimately lead to a need for either different educational methods or educational facilities larger than the typical early American one-room schoolhouse. The imitation of English architecture and the desire to educate a larger population would ultimately lead to the American adoption of a uniquely English educational program, the Lancastrian system.

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[6] Castaldi, op. cit., 13.

[7] Edgar W. Knight, Education in the U.S., 3rd ed. (Boston: Ginn and Company, 1957), 24.

[8] Castaldi, op. cit., 11.

Nineteenth Century

The Lancastrian school system of England made its debut in urban America in 1806. This system marked a beginning for education of the masses in the United States. Under the Lancastrian system, one teacher would drill a group of fifty head pupils, who would then in turn teach ten other students. Thus, one teacher could teach five hundred students.[9] Instruction by this method was usually question and answer, and strict discipline was enforced. The design of such a system was efficient, with educational costs around $1.22 per pupil per year, but overcrowding and absolute conformity was the standard.[10] The average Lancastrian style classroom was fifty feet by one hundred feet, housing up to five hundred pupils in rows of long benches; therefore, the average space per pupil was ten square feet, less than a third of present levels. The Lancastrian system was not a panacea, however, it required large numbers of pupils to be effective, thus addressing only the urban education problem. It soon faded from the American school scene to be replaced by other, more desirable and humane methods. Though short lived in America, the Lancastrian system did have a lasting impact. By showing the American public that cost effective education for the masses was possible, it opened up the possibility of free education (tax supported) for all.

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[9] The Cost of a Schoolhouse. (New York: Educational Facilities Laboratories, 1960), 20.

[10] Ibid., 21.

By mid-nineteenth century, two variations of the American schoolhouse emerged. In urban areas, an alternative means of educating the masses evolved, that being the multi-grade, multi-room schoolhouse, but in rural areas the one-room schoolhouse was still the prevailing structure. In 1848, of the 9,368 schools in the state of New York, 8,795 or 94 percent, consisted of only one room.[11] Barnard described the deplorable condition of these schoolhouses as small, so small that in many cases students away from the entrance must climb over those already seated, in order to reach their desks. In the winter, the room was filled with the impure gases caused by heating, and near the walls, cold air rushed in through broken windows and chinks in the wall. In almost all cases, student desks were of improper size for their body, student's legs dangle, unable to touch the floor and they had to write on tabletops so high that they wrote by guess not sight.[12]

The development of the urban, graded school system was the natural evolvement of several factors: increased enrollment, the expansion of the school curriculum, increased accessibility of textbooks, the lengthening of the school year, and the expectation of further years of school attendance. The new multi-grade system would change urban school architecture significantly. Granted, the rural schoolhouse was still stereotypically of the one room variety, but in school districts of moderate size, the school building became a structure containing two or four classrooms, separated by a corridor. To some historians, this represents an event in American school architecture, as Perkins cited, "at least they were planned around the classroom."[13] To others, such as Roth, this was a start, but insufficient, "The design of the ordinary school building took no account of its nature or various functions. The solution adopted was nothing but an addition of classrooms, one exactly like the other."[14] High ceilings and tall, narrow windows allowed considerable light into the classroom, but no considerations were given to blinds or curtains. Toilets continued to be a venture outside, even though indoor plumbing had become acceptable and available.

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[11] Henry Barnard, School Architecture; or Contributions to the Improvement of School-Houses in the United States (New York: A.S. Barnes & Company, 1848), 37.

[12] Ibid., 32-40.

The greatest architectural impact of the multi-grade system would be felt in the large metropolitan centers. Characteristic of this period was multi-story schoolhouses of two, three, or four levels, not including basement or attic. Usually made of brick, they typically contained a center corridor, double loaded to house even numbers of classrooms on each floor. Perkins described these schools as having an abundance of fire hazards, with the fire drill being a integral part of the typical school curriculum.[15] The Quincy Grammar School and the Capen Primary School, both of Boston, are examples of these structures. The Quincy Grammar School contained four floors with the fourth being a large assembly area capable of housing the entire student population, 660 students. On the first through third floor, there were twelve classrooms, four per floor, each of identical size. A unique feature of this school was that instead of the traditional bench and table, it provided a separate desk and chair for each student, although both were bolted to the floor.[16] Cubberly discussed the impact of the Quincy building:

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[13] Lawrence B. Perkins and Walter D. Cocking, Schools (New York: Reinhold Publishing Company, 1949), 234.

[14] Alfred Roth, The New School (New York: Frederick Prager, 1957), 24.

[15] Perkins and Cocking, loc. cit.

[16] The Cost of a Schoolhouse, op. cit., 22.

> This building formed a new architectural type which was extensively copied, in Boston and elsewhere, and this new building with its twelve classrooms, assembly hall, principals office, was thought by many to represent such an advance that little improvement would ever be made on it. For the next fifty years it was the standard type of elementary school building erected in our cities. . . . This was in large part due to the fact that this type of building was so well adapted to a drill-and-content type of course of study, which from about 1850 to about 1900 was the dominant one.[17]

The Capen Primary School contained six classrooms, two per floor, on each of its three floors. Boys and girls were educated separately, with each sex housed on separate ends of the building. The basement area was used for play areas, again divided by sex.[18] The concern for proper playground areas was not limited to this specific school. Chapter 338 of the 1895 New York City School Laws declares: "Hereafter no school house shall be constructed in the city of New York without an open-air playground attached to or used in connection with the same."[19]

The final decades of the nineteenth century would bring several developments to the public schools of America, the introduction of the kindergarten (1873), manual arts training (the predecessor to today's industrial arts and home economics) for boys and girls (1876), the reduction in the numbers of pupils per classroom from 40 down to 30 (1890s to 1920s), and a new progressive outlook on education. This progressivism, which came from the ideas of Pestalozzi, John Dewey, and William James, replaced the idea of the student as a passive "sponge" soaking up knowledge to one of creative participation and learning by doing.[20] Unfortunately, this time period also accepted the segregation of schools for blacks and whites. As distasteful as the one-room schoolhouses of this period were, the segregated "coloured" schoolhouses were worse.

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[17] Elwood P. Cubberly, in The Cost of a Schoolhouse, loc. cit..

[18] E.R. Robson, School Architecture (1874; reprint, New York: Humanities Press, 1972), 31.

[19] Charles R. Skinner, preface to Recent School Architecture (New York: Wynkoop, Hallenbeck, and Crawford Company, 1897).

[20] The Cost of a Schoolhouse loc. cit.

Twentieth Century

If the urban elementary school of the nineteenth century was to become large, the urban secondary school of the twentieth century was to become enormous. Between the final decade of the nineteenth century and the Depression of 1929, the "classical" or "box" public high school emerged. They have been described as:

> . . . either castles or palaces and their architectural style either Gothic, Renaissance or Baroque, or a combination of styles. Whatever their shapes or forms were, they in no way resembled a school (in the functional sense). The child's own scale was not taken into consideration, either practically or emotionally. Out-sized entrances, corridors, stairways seem to be particularly selected by the architect for his "artistic" effects with the well meant aim of contributing to the child's education in art.
>
> It would be wrong and unfair to blame the architect alone. The absence of unbiased pedagogical conceptions, and of a curriculum based on them were as much a cause of mistaken evolution, as was the lack of close collaboration between the architect, educator and building authority.[21]

The vast increase in size of public school buildings was due in part by the push to educate all Americans, not just the elite. From 1899 to 1920, the enrollments of public schools doubled every decade, while the average IQ of pupils enrolled in public school dropped from 115 to just over 100.[22]

Classroom sizes during this time period were small in floor space but expansive in height. Snyder described the typical classroom as "Length 30 feet; width 22 to 24 feet (which allows for the inclusion of the wardrobe on the inner wall of the room); height 14 feet 3 inches."[23] Even with the expansive height, classrooms were crowded and dimly lit.

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[21] Roth, op. cit., 26.

[22] The Cost of a Schoolhouse, op. cit., 25.

[23] Modern School Houses: Part II (New York: The American Architect, 1915), 9.

Snyder described the optimal lighting as "the area of window openings should be fixed at not less than twenty five percent of the floorspace" and "natural illumination should be at right angles to the longer axis of the classroom" with " grouping of windows to the left side of the student preferred."[24] Though this marks one of the earliest accounts of schools being designed with the student in mind (lighting from the left side would not shadow the writing of a right-handed pupil), the total fenestration would be marginal by modern standards.

The effects of World War I on the schoolhouse would be tremendous. Over one third of all men drafted for the service were rejected as unfit for duty, giving rise to strong public support for physical education programs (and gymnasiums) in schools. In addition, the war united the nation on another curricular and schoolhouse addition, music. America buoyed her spirits with organized singing and marching bands, and instrumental/vocal music rooms became a part of every school.

Following the war, the American school became the center of the community and, as public expectations grew, so did the school programs. Cafeterias, year-round playgrounds, and school nurses were added, along with spaces for advanced sciences: biology, chemistry, and physics.

Perkins and Associates describe:

> An influence of important educational and social value has been created in the high schools by the development in recent years of the lunch period. The tin lunch box with its cold contents carefully packed by mother, and possibly reinforced with a bowl of hot soup, has been largely done away with in the great high schools where food is mechanically prepared and served to almost the entire student body.[25]

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[24] Ibid.

[25] Perkins, Fellows and Hamilton; Architects, Educational Buildings (Chicago: The Blackely Printing Company, 1925), 224.

The Depression years brought the state and federal involvement into school construction, as the federal government began financing school construction, and state governments adopted building standards. But even though the advances in school function were considerable, the architecture of the school stood still. Roth describes the schoolhouse of the 30s and 40s as "a brick box with holes for windows in a style which can be described only as neuter."[26]

Built in 1940, the Crow Island School of Winnetka, Illinois has often been described as an educational architecture maverick. Considered one of the one hundred most influential architectural structures of this century and the most influential academic structure, the Crow Island School's unique child-centered design gave birth to a revolution in school architecture, the one story, flat roofed school buildings of the 1950s and 60s with large classrooms and expansive window space.[27]

The Post-World War II era was to mark the start of school architecture as a separate field. School leaders began to consider the function of education holistically when designing buildings. The science of schoolhouse planning gained prominence with the publishing of several texts by Reid,[28] Caudill,[29] and Englehardt.[30,31,32,33] These authors detailed the importance of the curriculum, instructional method and grade level in the planning process. Further, they described this relationship in such a manner that the school practitioner, architect, and school board member could easily comprehend and utilize. The planning of school structures was no longer a function of a few, but instead began to take a collaborative approach as citizens' committees joined the ranks of the local school officials and architects in designing school facilities.

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[26] Roth, op. cit., 29.

[27] American Institute of Architects, Conference notes from Children, Learning and School Design: A National Invitational Conference For Architects and Educators. Evanston Ill: Northwestern University, November 16-18, 1990.

[28] Kenneth Reid, School Planning: The Architectural Record of a Decade (New York: F.W. Dodge Corporation, 1951).

[29] William W. Caudill, Toward Better School Design (New York: F.W. Dodge Corporation, 1954).

[30] N. L. Engelhardt, Complete Guide for Planning New Schools (West Nyack, NY: Parker Publishing Company, Inc., 1970).

[31] N.L. Engelhardt, N.L. Engelhardt, Jr., and Stanton Leggett, Planning Elementary School Buildings (New York: F.W. Dodge Corporation, 1953).

Educational programs and philosophy began to take precedence over strict utility as "color, warmth, and a place in which to work and act vigorously" became "keynotes of the earliest program."[34] In addition, advances in artificial lighting and new requirements for health and safety would impact school design. The traditional fourteen foot ceiling would be replaced by a nine foot standard. Cost of multi-story buildings and concerns for the fire safety of students would change the established norm from three floors down to one story.[35] The study of instruction and how students learn would also effect school design. The team teaching movement of the late 1960s would open up interior spaces to experimental "schools without walls, open-space planning," and adaptable learning areas.[36,37]

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[32] N.L. Engelhardt, N.L. Engelhardt, Jr., and Stanton Leggett, Planning Secondary School Buildings (New York: F.W. Dodge Corporation, 1949).

[33] N.L. Engelhardt, N.L. Engelhardt, Jr., and Stanton Leggett, School Planning and Building Handbook (New York: F.W. Dodge Corporation, 1956).

[34] The Cost of a Schoolhouse, op. cit., p 33.

[35] Ibid, p. 34.

[36] Schools Without Walls (New York: Educational Facilities Laboratories, 1968).

[37] Schools for Team Teaching (New York: Educational Facilities Laboratories, 1961).

In the early 1960s, the sociological impact of nuclear testing caused some schools near test sites to consider underground educational facilities, so that they could serve double duty as fallout shelters. Though this did not come to pass, the sociological,[38] feasibility, and lighting studies undertaken at this time, combined with the advancements in environmental control,[39] artificial lighting, and floor coverings, would lead to dramatic changes in interior design for the seventies. These changes would include introduction of year round climate control (air conditioning) and the carpeting of schools. Changes in fenestration would occur also, as the widespread use of fluorescent lighting and air-conditioning, combined with the 1970s energy crisis, would shrink the size of classroom windows to mere slits or portals.[40]

Many of the architectural changes of the 1970s and 1980s have been the secondary result of federal legislation. This legislation, Section 504 of the Rehabilitation Act of 1973, and the Education of All Handicapped Children Act of 1975, led to the introduction of "barrier free" and "wheelchair access" school facilities.[41,42] To comply with necessary requirements many new schools have been designed with ramps, and in some cases even elevators.

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[38] Theodore C. Larson, The Effect of Windowless Classrooms on Elementary School Children (Michigan: The University of Michigan, 1965).

[39] Airconditioning For Schools (New York: Educational Facilities Laboratories, 1971).

[40] Total Energy (New York: Educational Facilities Laboratories, 1967).

[41] Barrier-Free School Facilities for Handicapped Students (Arlington: Educational Research Service, Inc., 1977).

[42] Allen C. Abend et al., Facilities for Special Education Services (Reston, VA: The Council for Exceptional Children, 1979).

The 1980s brought the age of "retrofit" changes to school facilities. The "open space concept" or "schools without walls" of the 1960s and 1970s was a dismal failure in most schools. Teachers, trained in a different educational philosophy, had difficulty committing to the team teaching and open classroom concepts. The failure of this architectural design was not in the facility itself, but in the lack of teacher input and commitment in the planning process. Where teachers were resistant to change, the open school concept was doomed to failure. The quick fix for many of these schools was the erection of partitions, bookcases, coat racks and even house plants as visual and auditory walls to separate classroom spaces. The growing trend for the 1980s was the replacement of interior walls between classrooms in open concept schools, a costly proposition particularly in light of mechanical and electrical systems.[43]

It is clear that the educational function of the school evolves and changes. It is also clear that school architecture, particularly in new school construction, has attempted to meet the educational challenge of the time. What can we expect future school facilities to be characterized by? Cunningham explains:

> There has been significant changes from America's one-room schoolhouses at the end of the 17th century to the large complicated school system that exists at the end of the 20th century. It is already quite clear that the 21st century will be quite different from any our history has recorded.[44]

Future Educational Facility Architecture

During the twenty-first century, several authors have made forecasts as to the future of school facilities. Unfortunately, the majority of these forecasts are either dated or are the reflections of a singular author's opinion. Few of the forecasts reflect a reasoned, scientific consensus of an organization or group.

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[43] Frank A Stasiowski, "1991 Market Forecast-Look for Market Niches" Architecture/Engineering Journal (Newton, MA: November 1990), 5-6.

[44] William G. Cunningham, Systematic Planning for Educational Change (Mountain View, CA: Mayfield Publishing Company, 1982), 247.

The purpose intended for this section is to briefly describe the limited literature surrounding the forecasts of past authors. It should be noted that the term "future" has been used in this study to denote a period of time five to fifty years ahead in time. Whether these authors utilized the same five to fifty year standard is not known. It is this researcher's perception that the five to fifty year standard was probably appropriate to the below authors, and that a period of time exceeding fifty years was not considered.

Donovan (1921) foresaw the consolidation of small specialized high schools into one large comprehensive high school. In addition, he had a vision of heating and electrical ducts placed in the ceiling, so that partitions and walls could be moved at will.[45]

In 1931, Harrison predicted the use of radio, television, and motion pictures as modes of classroom instruction, with "a great control radio university" located at the center of urban areas to draw upon the brightest scholars, who could immediately put the latest discoveries "on the air." He saw the school as central to the community and in use "at least sixteen hours out of every twenty-four." Harrison's view of future instruction included, through the use of television, the ability for teachers and students to talk interactively at different sites. In addition, space limitations in cities would require schools to grow vertically, becoming skyscrapers with businesses and apartments on the lower floors and schools at the top. Finally, he anticipated the need for teacher and office desks to hang from the ceiling, as it permitted greater access for cleaning. [46]

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[45] John J. Donovan, School Architecture: Principles and Practices (New York: The MacMillan Company, 1921), 28.

[46] W.K. Harrison and C.E. Dobbin, School Buildings of Today and Tomorrow (New York: Architectural Book Publishing Company, Inc., 1931), 3.

Leaders in the Educational Facility Laboratories (1966), a primary producer of school facility research, also viewed the possibility of a school/business partnership in the ownership of an urban facility. However, they predicted that the schools of this type would be on the lower floors or even subterranean. In addition, with increased land prices, they predicted the construction of schools over railroad yards, highways, and water. Finally, they suggested that "education parks" or the clustering of an elementary school, secondary school, and a small college on one site, could become a reality.[47] Another publication from the Educational Facility Laboratories (1960) contained a prediction that the increased use of portable classrooms, movable walls, climate control, and the "humanizing" of the classroom would be seen.[48]

The most notable source of information concerning the impact of change on school architecture (including future architecture) has been the Council of Educational Facility Planners International. This organization represents one of the few studies which reflect a group's perception of considerations which would impact future school facilities. In 1970, members of the Council of Educational Facility Planners International noted seven educational trends which they felt impacted or would impact school facilities,[49] updating this list with three more in 1972.[50] These trends included:

1. individualized learning;
2. the changing role of the teacher;

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[47] The Schoolhouse in the City (New York: Educational Facilities Laboratories, 1966).

[48] The Cost of a Schoolhouse, op. cit.

[49] "New Trends in Education," The Council of Educational Facility Planners Journal 8, no. 5 (1970): 7-14.

[50] "More New Trends in Education," The Council of Educational Facility Planners Journal 10, no. 4 (1972): 7-10.

3. education will include learning experiences in the community;

4. significant change in the learning path of the student;

5. the flow of students within a school will emphasize flow, not surge;

6. administrative grouping of students into "houses" with a larger number of students and teachers, instead of classes;

7. open space planning;

8. modified open space;

9. neighborhood "house schools"; and

10. encapsulated space (inflatable buildings).

Brubaker, one of the more prolific writers on future educational facilities, cited several architectural design trends that he felt would impact future school facilities:

1. individual computers and response systems at each desk;

2. innovative building materials including air supported structures and electrified floors;

3. a movement back towards pitched roofs;

4. expanded services to the community such as child care, continuing and adult education, and career education;

5. the renovation of former industrial buildings as school facilities; and

6. the local school will become the community center, housing health and welfare programs for all ages.[51,52,53]

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[51] C. Williams Brubaker, "Trends in the Planning and Design of School Facilities," The Council of Educational Facility Planners Journal 19, no. 6 (1981): 4-8.

[52] C. Williams Brubaker, "These 21 Trends Will Shape the Future of School Design," American School Board Journal, April 1988: 31-36, 66.

[53] C. Williams Brubaker, The Future Outlook for School Facilities Planning and Design (ERIC, ED 261 469, 1985), 1-13.

McInerney (1987) foresaw schools as buildings designed to enhance the capabilities of technology, particularly through the computer networking of the school, community and home.[54] In addition, sensitivity to electronic learning, commons areas, community use, handicap access, shared learning spaces, learning centers, and cost-effectiveness have all been noted as recent design trends for future school facilities.[55,56] The California State Department of Education (1990) has predicted that the schools of the twenty-first century will be based upon the inherent design needs of the following factors:

1. the use of a variety of instructional methods;
2. the student use of manipulative materials in learning;
3. increased collegiality and professionalism among teachers;
4. more services for children at risk of failure;
5. preschool and before- and after-school care;
6. community use of facilities (including non-school functions);
7. school size;
8. increased parental involvement;
9. appropriate use of technology in curriculum and assessment;
10. year round education; and
11. buildings that are modular /flexible.[57]

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[54] William D. McInerney "Potential Impacts of Educational Futures on Educational Facilities," Council of Educational Facility Planners Journal (Columbus, Ohio: Council of Educational Facility Planners; December, 1987), 25-26.

[55] C. William Day and Robert Moje. "Smart Schools for the Next Century," Learning by Design (Alexandria VA: National School Boards Association, March 1993), 2-3.

[56] C. William Day and Robert Moje. "Enhancing Learning Through Design," Learning by Design (Alexandria VA: National School Boards Association, April 1992), 2-3.

[57] California State Department of Education, Schools for the 21st Century (Sacremento, CA: California Department of Education, 1990).

The Committee on Architecture for Education (1990) suggested that program offerings will require a future educational facility designed around the principles of access, security, and flexibility.[58] Perelman on the other hand sees the effects of technology de-emphasizing central educational facilities in favor of "hyperlearning" or as he stated "schools will be transformed from a centralized architectural and bureaucratic structure to a dispersed information and service channel."[59]

It is clear that some of the predictions by recent writers have come true, some not yet, and yet others may never occur. In today's society, movable walls, overhead utility services, carpeting, and air conditioning are all considered rather common. Radio, motion pictures, and television have all been used extensively in instructional activities. Interactive television and satellite instruction are now a reality. Today's school buildings are often open past normal school hours, as adult or community education programs are offered in the evenings. Of the various predictions made, many have come to pass, others have not come true, and still others have come true in reduced fashion, being accepted as commonplace in limited regions.

Reviewing the literature on educational facility futures illustrates two reasons for further research in this area: the majority of the literature base is dated and therefore does not take into consideration the changes and advancements of modern society; and that which is current, in most part, comes from individuals or groups whose expertise is architecture or education but unfortunately not the future. Further research in this area, using scientific, futures research methodology, will update the limited sources and provide a reasoned, group consensus on the future, a perspective which is notably lacking in much of the literature on school facilities.

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[58] Heather Paul Kurent and Robert L. Olsen, Architecture-Related Concerns for Future Learning Environments (Washington D.C.: The American Institute of Architects Committee on Architecture for Education, 1990).

[59] Lewis J. Perelman, School's Out: A Radical New Formula for the Revitalization of America's Educational System (New York: Avon Books, 1992), 25 and 57.

Architectural Programming

Historically, school facility design has been influenced by many factors, including law, society, environment, and philosophy. Changes in the architectural design of school facilities has often been the result of information obtained during architectural programming.

Architectural programming is the identification, definition, and analysis of a particular design problem. Specifically, programming is an analytical and systematic process of accumulating and comprehensively examining information necessary for the decision making and design of a structure.[60] Moleski defined programming as "simply that part of the design process which enables the architect to identify and define the problems which must be solved."[61] Programming is the transference of owner needs and desires, along with human, physical, and external factors into appropriate information and language for design decisions.[62]

In essence, programming is information collection, processing, and analysis, which in final form the design architect utilizes in developing appropriate solutions to the identified problems. Architectural design is the creative and interpretive application of the architectural program into a building solution that meets the needs of the client.

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[60] Mickey A. Palmer, The Architects Guide to Facility Programming (Washington D.C.: The American Institute of Architects,1981), 3.

[61] Walter Moleski, in Mickey A. Palmer, The Architects Guide to Facility Programming (Washington D.C.: The American Institute of Architects,1981), 6.

[62] Palmer, op. cit., 23.

Spreckelmeyer graphically illustrates the relationship of programming to architectural design in Figure 2.1.[63] The foci of programming and design is fairly clear. Palmer described the differences: "Designing is primarily intuitive, creative synthesizing, interpretive. Programming is rational, investigative, analytical, objective. The issues and subject matter may be the same-design information-but the perspectives and approaches are different."[64] Pena clarified the foci succinctly, "programming is architectural analysis and designing is architectural synthesis" or simply "programming is problem seeking and design is problem solving."[65]

Though considerable difference of opinion exists as to whether architectural programming is a distinct or an integral part of the design process, the relationship between programming and design is fairly clear, "programming and design are two parts to the same process: development of architecture primarily to accommodate the needs of the client."[66]

The Principles of Programming

During programming the architect seeks to find information to three key questions: what factors will influence the facility, what are the significances of each influence, and how do these influences interact with each other and the potential facility to influence its design.[67] The methods used to answer these questions are varied in nature, but include direct behavioral observations, client interviews, surveys, archival records, and

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[63] Kent Spreckelmeyer, "Environmental Programming" in Methods in Environmental and Behavioral Research, eds. Robert Bechtel, Robert Marann, and William Michelson (New York: Van Nostrand, 1987), 249.

[64] Palmer, op. cit., p.17.

[65] William M. Pena, with William Caudill and John W. Frocke, Problem Seeking-An Architectural Programming Primer (Boston: Cahners Books International Inc, 1977), 18.

[66] Palmer, op. cit., 16.

[67] Palmer, op. cit., 17.

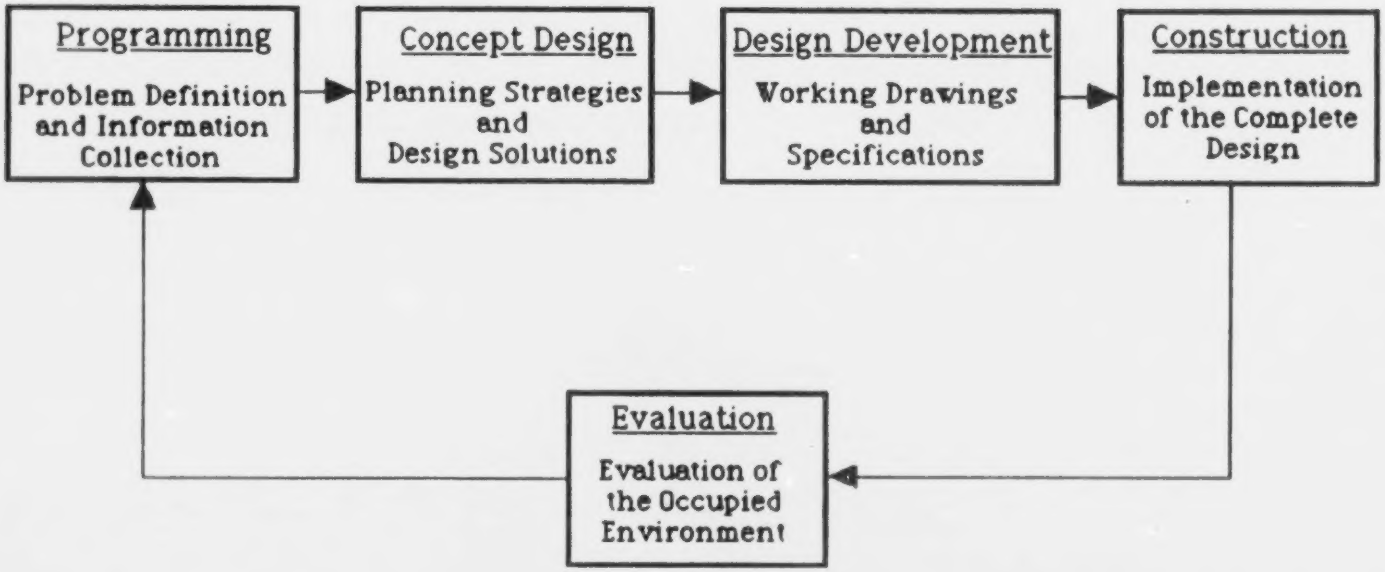
Programming
Problem Definition and Information Collection
Concept Design
Planning Strategies and Design Solutions
Design Development
Working Drawings and Specifications
Construction
Implementation of the Complete Design
Evaluation
Evaluation of the Occupied Environment

Figure 2.1

The Relationship Between Programming
and the Architectural Design Process

Source: Kent Spreckelmeyer, "Environmental Programming," in Methods in Environmental and Behavioral Research Eds. Robert Bechtel, Robert Marann and William Michelson (New York: Van Nostrand 1987), 249.

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standardized data forms. Though there are many methods to collect programming data, three principles are common to all: systemization, iteration, and progression.[68]

Throughout history architectural programming has been an informal affair, but in the past thirty years it has grown into an accepted science and practice. Much of programming's acceptance can be attributed to legal litigation and a more complex, diverse, and specialized society, which requires a more systematic method to ascertain user needs and external influences on architectural design. Through systematic methods, the programmer can process and manage the vast amounts of information generated by modern society, and in a manner which is both accurate and economical.

One compliment to the systematic method is iteration or the cyclic review, evaluation and feedback of accumulated data. The large amounts of data generated by programming are generally processed and analyzed in iterations or cycles. This cyclic process permits the programmer to make basic statements concerning the program and then test these statements against new data as it is accumulated. This process, which is similar in nature to the constant/comparative analysis of qualitative research and the iterative feedback analysis of the Delphi method, permits the programmer to refine the data in a logical and useful manner. The iteration process utilized in architectural programming is graphically represented in Figure 2.2.

Throughout the iterative process of collection, analyzation, and evaluation, the programming findings proceed from general concepts to specific statements. This progressive process, in conjunction with systematic and iterative research methods, acts as a funnel to reduce the voluminous amount of acquired data into a succinct statement of what the designer needs to know or ought to do.

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[68] Palmer, op. cit., 24.

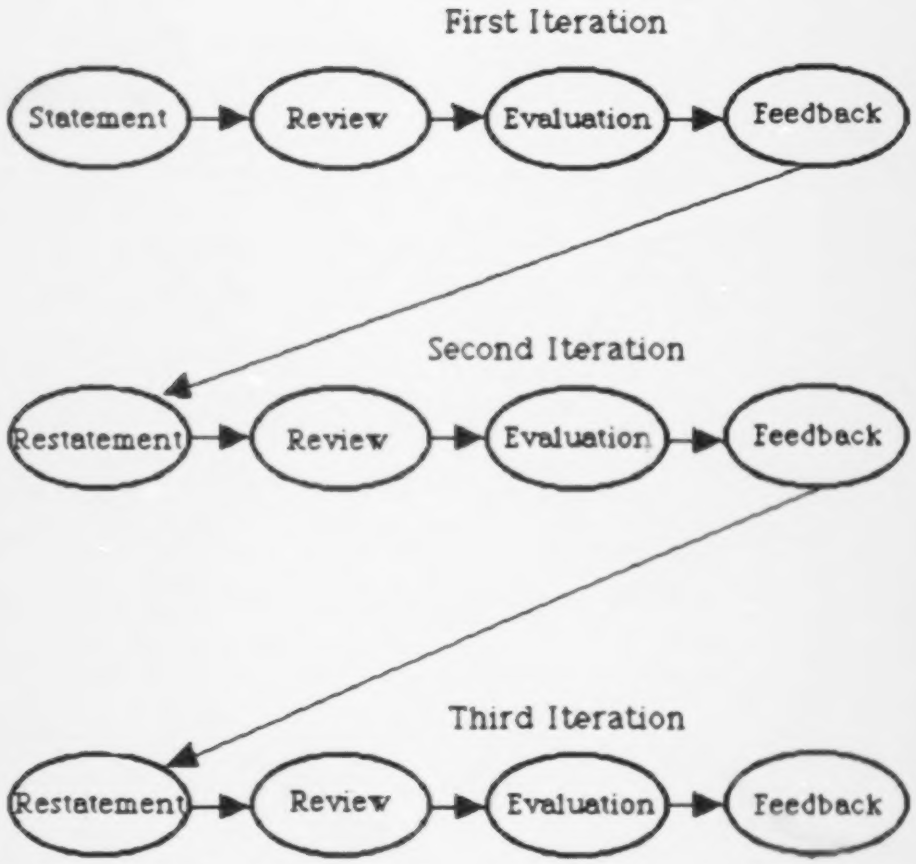

Figure 2.2

Iterative Programming Style

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Source: Mickey A. Palmer. The Architects Guide to Facility Programming (Washington D.C., The American Institute of Architects, 1981), 27.

The Process of Programming

There are several procedures that help the programmer focus the data collection and analysis efforts. The terminology and impetus may vary between different programming authors but the effect is the same, to add systemization to the programming process.

William Pena, noted architectural author and programmer, suggested five steps (actually five driving questions) in the process of programming. The first three steps involve primarily a search for pertinent information, the fourth a test for feasibility, and the fifth is the culmination of the systemization, iteration, and progression principles previously mentioned. The first four steps are not necessarily sequential, but the fifth step must always be the culmination of the process.

Step 1. Establish Goals- *What* does the client want to achieve and *Why*?

Step 2. Collect Facts- *What* is it all about?

Step 3. Uncover Concepts- *How* does the client want to achieve the goals?

Step 4. Determine Needs- *How* much money, space and quality?

Step 5. Problem Statement- *What* are the significant conditions and the general directions the design of the building should take?[69]

Other programming authors have suggested alternative guides to uncovering programming information. Palmer recommends that programmers seek information pertinent to three conclusions entitled ascertainments, predictions, and conclusions.

> Ascertainments are statements of conditions, processes and events that influence, restrict, and/or enhance the facility's design and that should be accommodated or created. Predictions are forecasts about the influences of certain factors, projections of future conditions and expectations of the consequences of design decisions. Recommendations are specific directions or proposed actions as to what should be done to accommodate or create desired conditions, processes and events for effective design.[70]

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[69] Pena, Caudill, and Frocke, op. cit., 24-25.

[70] Palmer, op. cit., 21-22.

Pena's steps (or questions) are input driven concerns. Palmer's conclusions are taken from an output driven perspective, but both of these methods serve the same utility, to focus and add consistency to the programming process.

Program Content

The program is the culminating document of the programming process. As such it stands as the essential link between programming and design, or as Palmer suggests, "the final stage (in) programming and the first stage in designing."[71] Sanoff gave a clear description:

> A program is a communicable statement of intent. It is a prescription for a desired set of events influenced by local constraints, and it states a set of desired conditions and the methods for achieving those conditions. The program is also a formal communication between designer and client in order to determine that the client's needs and values are clearly stated and understood. It provides a method for decision making and a rationale for future decisions.[72]

However, the program is not merely a list of user needs, spaces, and sizes with a few key relationships and costs. A program that is merely a compilation of data collected is deficient. The program must be the distillation of the preliminary parameters and voluminous raw data into essential and relevant facts and conclusions. Design architects do not have the time or inclination to wade through mountains of data; therefore, to be usable, the content of the program must be concise and in a format or language which is usable to the designer.

In an effort to be consistent in format and analysis, Pena suggested that programmers utilize four information considerations to guide them at each of the five steps previously discussed. These considerations are: function (people, activities, relationships), form (site, environment, quality), economy (budget, operating costs, life cycle costs), and time (past, present, future).[73]

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[71] Palmer, op. cit., p. 21.

[72] Henry Sanoff et al., Methods of Architectural Programming (Stroudsburg, Pennsylvania: 1977), 4.

Palmer suggested three alternative information classifications: human, physical, and external factors. Human factors include client goals and information, demographic data, activities, relationships, attitudes, preferences, and perceptions. Physical factors include location, site, space, dimensions,circulation, environment, equipment, and furnishings. Finally, external factors are those which the client and architect have little or no control over: legal codes, climate, construction time, future conditions, and energy resources.[74]

By establishing a systematic set of relationships between steps and information considerations (Pena), conclusions and classifications (Palmer), a comprehensive approach to programming is assured.

Strategic Planning

Olsen and Eadie define strategic planning as the "disciplined effort to produce fundamental decisions shaping the nature and direction of governmental activities within constitutional bounds."[75] It "concerns itself with managing mission-oriented social organizations. It is inherently value-oriented, setting objectives and goals with an eye to pursuing its mission and allocating its resources and management talents to achieve those goals."[76] A process that "requires broad scale yet effective information gathering, an exploration of alternatives, and an emphasis on the future implications of present decisions"[77] and the "deciding on objectives for an organization, on changes in those objectives, on the resources used to obtain objectives, and on the policies that are to govern the acquisition, use, and disposition of the resources." [78] McCune defines and describes strategic planning as a rational process or series of steps that move an educational organization through:

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[73] Pena, Caudill, and Frocke, op. cit., 32-33.

[74] Palmer, op. cit., p.19.

[75] J.B. Olsen and D.C. Eadie, The Game Plan, Governance With Foresight (Washington, D.C.: Council of State Planning Agencies, 1982), 32.

[76] J. L. Morrison, W. L. Renfro, and W. I. Boucher, eds., "New Directions in Futures Methodology," Applying Methods and Techniques of Futures Research (San Fransisco: Jossey-Bass, 1983), 75.

> 1. understanding the external forces or changes relevant to it;
> 2. assessing its organizational capacity;
> 3. developing a vision (mission) of its preferred future as well as a strategic direction to follow to achieve that mission;
> 4. developing goals and plans that will move it from where it is to where it wants to be;
> 5. implementing the plans it has developed; and
> 6. reviewing progress, solving problems, and renewing plans.[79]

It is clear that strategic planning and forecasting of futures are undeniably linked. Cross noted the principal characteristic of planning as its orientation to the future:

> Time is a valued and depletable resource consumed in effecting any end. Planning, an end-directed process is therefore future oriented. Each of the ultimate objectives of planning implies a need in the present for information about the future.[80]

Or simply, "a forecast is input to the planning model."[81]

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[77] John M. Bryson, Andrew H. Van de Ven, and William D. Roering, Strategic Planning and the Revitalization of the Public Sector (University of Minnesota: The Strategic Management Research Center, 1984), 3.

[78] Cunningham, op. cit., 12.

[79] Shirley D. McCune, Guide to Strategic Planning for Educators (Alexandria, VA: Association for Supervision and Curriculum Development, 1986), 32.

[80] Donald Cross, Forecasting in Urban and Regional Planning (Social Science Research Council, 1975), 12.

[81] J. Scott Armstrong, Long Range Forecasting: From Crystal Ball to Computer (New York: John Wiley & Sons, Inc., 1985), 6.

Castaldi related the nature of planning and the future to school facilities as a:

> process whereby the actions of the past and present are logically and sensibly related to those planned for the future. Because of the permanent and fixed nature of both school buildings and instructional equipment, it is essential that future planning be based upon sound reasoning and desirable educational objectives.[82]

In conclusion, Cunningham presented an analogy for educators on the need and purpose of planning and futures research during these increasing times of change.

> The faster a racing car travels over its cross country course to its destination, the farther ahead the driver must look if he or she is to avoid collision and manage the obstacles in front. This image should appear very accurately to the educational administrator who is faced with the fast pace of our present times. Educational administrators must have a view of the future- even if a blurred view- if they wish to stay in the race.[83]

Futures Research

The Concept of the Future: Past

The human race has long been fascinated by the idea of a future. Many aspects of religion, writing, and technology were based upon a concept of a future. Various religions prescribed to some form of future life after death. Ancient Egyptians buried their kings with food, weapons, clothing, and even boats to assist them in their journey to the afterlife. Christians believe in the concept of heaven and hell. The final book of the Bible, the Book of Revelation, is believed by many to prophesize the future.

Through the centuries, many notable authors have written about society and the future. Plato's Republic described a utopian society based upon reason and justice; Thomas More's Utopia described a democratic society where private property was abolished; H.G. Wells' The First Men in the Moon prophesized man's exploitation based upon highly developed technology; and George Orwell's Nineteen Eighty-Four described the future domination of government over mankind.[84]

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[82] Castaldi, op. cit., 104.

[83] Cunningham, op. cit., 246.

The future has not been limited to societal accounts however. Leonardo da Vinci foresaw the invention of the helicopter; Thomas Bacon, the self propelled ship, car, and airplane; Jules Verne and H.G.Wells, space travel.[85]

Each of the above men had a vision of what the future might bring. Today, men and women of vision are either considered futurists or fortune tellers, though the two have little in common. Fortune telling, an ancient practice, involves the prediction of an individual's future through astrology, biorhythms, tea leaves, crystal balls, tarot cards or palm reading. Futurism, or the study of the future, is a scientific and rational discipline designed to predict future possibilities for civilization. Fortune tellers believe in a divine fate, futurists in a world shaped by human actions and decisions.[86]

The Concept of the Future: Present

The development of futures research as a formal discipline did not occur without cause. The first half of twentieth century had been an era of immense dynamic change. The horse, a prominent form of transportation for centuries, was replaced by motored automobiles and then the airplane. The use of technological innovations such as electrical lights, radio, and telephone became widespread. Warfare was revolutionized by mustard gas, automatic rifles and pistols, and eventually the atomic bomb. In one fifty-year period of time, human society was subjected to greater change than in much of the previous centuries combined, and this change was growing in ever quickening leaps and bounds. Cook noted that "the universal body of human knowledge had doubled in ever diminishing intervals," in essence:

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[84] Fred Polak, The Image of the Future (San Fransisco, CA: Jossey-Bass Inc, 1973).

[85] I.F. Clarke, The Pattern of Expectation (New York: Basic Books, Inc., 1979).

[86] Thomas E. Jones, Options for the Future: A Comparative Analysis of Policy-Oriented Forecasts (New York: Praeger Publishers, 1980), 1.

> from 4 B.C. to A.D. 1900
> from 1900 to 1950
> from 1950 to 1960
> from 1960 to 1965
> and thus each three years.[87]

As society began to realize that immense change was inevitable, the need to foresee and plan for future change grew. Jones described this realization as "the undesirable consequences of runaway change dramatize(d) the need to use forecasting and planning to control change wisely."[88] Not only could change be controlled, but through proper consideration and planning, individuals and organizations could choose, to a certain degree, the direction and extent of change.[89] Joseph added to this by defining the purpose of futures research as ". . . to cause change and to manage the future."[90] Further, Coates described the purpose of futures research as to provide early warnings of impending change, and information crucial to planning and decision making. He cited the following trends as the reasons for futures research:

> 1. enhanced power of human beings over nature;
> 2. the larger scale of human enterprise;

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[87] William J. Cook, Jr., Strategic Planning for America's Schools (Arlington, VA.: American Association of School Administrators, 1990) 29.

[88] Jones, op. cit., 1.

[89] S. Enzer, "New Directions in Futures Methodology," in Applying Methods and Techniques of Futures Research, eds. J. L. Morrison, W. L. Renfro and W. I. Boucher (San Fransisco: Jossey-Bass, 1983), 69-70.

[90] E.C. Joseph, "An Introduction to Studying the Future," in Futurism in Education: Methodologies, eds. P. Hencley and J.R. Yates (Berkley: ETC Publications, 1974).

3. the throw-away economy with its huge demands for limited raw materials and its stupendous waste disposal problem;
4. growing interconnectedness of social institutions, with concomitant vulnerability of of society to disruption;
5. a shift in the values of affluent society towards disgust with the degradation of unpolluted, beautiful surroundings by technology's less esthetic by products; and
6. increasing scientific knowledge that has improved the human ability to anticipate future consequences of actions.[91]

The unprecedented technological changes of the twentieth century, compounded by the autrocities of World War II, led to a late 1940s and 1950s demand for national security. It was this military objective that invoked the greatest impetus for futures research. Backed by military and corporate funds, researchers began to study future military technology. From these studies evolved project RAND (an acronym for Research and Development) who's purpose was to "further and promote scientific, educational, and charitable purposes, all for the public welfare and security of the United States."[92] The RAND Corporation became the springboard for the study of the future in the United States, particularly the more prominent of the so-called consensus methods of forecasting, the Delphi process.

Exploratory and Normative Forecasting

During the 1950s and 1960s the aims of forecasting were split into two distinct approaches. The first of these, normative, sought to "prescribe what the future should or should not be like and then delineate paths for reaching or avoiding the selected future." The second, exploratory, sought "to describe the various futures that are relatively likely or unlikely to come about." [93]

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[91] Joseph Coates, "Technology Assessment: The Benefits . . .the Costs . . . the Consequences," Futurist, December 1971: 225-31.

[92] E. Cornish, ed., The Study of the Future: An Introduction to the Art and Science of Understanding and Shaping Tomorrow's World (Washington, D.C.: World Future Society, 1977), 85.

[93] Jones, op. cit., 23.

Based upon present and past conditions, exploratory forecasting "implies no future facts waiting to be discovered but refers to attempts to delineate alternative futures that may occur." [94] Exploratory forecasting is "based upon existing technology" and provides "predictions concerning future developments."[95] The three most common methods of exploratory forecasting are trend extrapolation, modeling, and the Delphi process.[96] One common use of exploratory forecasting in the field of school facility planning is the enrollment projection. Based upon a five-, ten- or fifteen-year quantitative history of previous school enrollments and preschool censuses, a yearly "survival ratio" is determined for each grade level. The mean "survival ratio" for each grade level is used to calculate projected enrollments for a period of five or ten years in the future.[97]

Normative forecasting assumes the existence of future technological innovations (predicted with exploratory forecasting) in the development of future goals and missions, then provides methods to achieve these goals.[98] The normative approach "emphasizes a thorough assessment of future goals and mission and works backwards from the goals to determine the best methods of obtaining them."[99] The most common form of normative forecast utilizes the Delphi process and quantitative feedback. Though normative forecasting using the Delphi process and qualitative feedback is unusual, it has been done using a Delphi variation called Qualitative Controlled Feedback,[100] and in the performance of an educational facility survey.[101]

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[94] Jones, op. cit., 17.

[95] William G. Sullivan and W. Wayne Claycombe, Fundamentals of Forecasting (Reston, VA: Reston Publishing Company, Inc., 1977), 193.

[96] Jones, op. cit., 18.

[97] Castaldi, op. cit., 415-426.

[98] Sullivan and Claycombe, loc. cit.

[99] Jones, op. cit., 17.

In essence, exploratory forecasting determines what might be possible based upon past and current trends, whereas normative forecasting determines what the most desirable future might be and then decides how one might get there.

Delphi Technique

One of the most prominent of the methods used to gain group consensus about the future is the Delphi technique. An outgrowth of research performed for the United States military by the RAND Corporation, the Delphi was originally used to determine the Soviet perception of the optimal industrial sites on which to drop atomic bombs in the case of war.[102] The Delphi process is described by Sullivan as "a systematic procedure for soliciting and organizing expert forecasts about the future through the use of anonymous, iterative responses to a series of questionnaires and controlled feedback of group opinions."[103] In its original form, the Delphi process generates and profiles the consensus or group of experts with regard to a specific issue or topic.[104]

Several features of the Delphi technique make it a desirable method of reaching group consensus on the future. Dalkey noted four features pertinent to Delphi study:

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[100] S.J. Press, "Qualitative Controlled Feedback for Forming Group Judgements and Making Decisions," Journal of the American Statistical Association, 1978: 526-535.

[101] Randy Rae McClanahan, "The Development, Utilization, and Analysis of a Normative Futures Research Method in a K-12 Educational Facilities Survey" (Ph.D. dissertation., University of Nebraska-Lincoln, 1988).

[102] Jib Fowles, ed., Handbook of Futures Research (Westport: Greenwood Press, 1978), 273.

[103] Sullivan, op. cit., 140.

[104] Norman C. Dalkey, The Delphi Method: An Experimental Study of Group Opinion RM 5888-PR (Santa Monica, CA: RAND, 1969).

1. anonymity. The participants are unknown to each other,
2. controlled feedback. Respondents are told about the group's responses on the preceding rounds,
3. statistical group response, or the opinion of every member of the group is represented in the final response, and
4. it is a rapid and relatively efficient way to "cream the tops of the heads" of a group of experts.[105]

Adding to this list, Fowles described the Delphi process as particularly useful in the following two circumstances.

1. The problem does not lend itself to precise analytical techniques but can benefit from subjective judgements on a collective basis.
2. The individuals who need to interact cannot be brought together in a face-to-face exchange because of time or cost constraints. Further, a conventional conference tends to be dominated by particularly strong personalities or to give rise to an undesirable bandwagon effect.[106]

The Delphi process is highly versatile, having been used in both normative and exploratory forecasting, and with both qualitative and quantitative feedback.

Conclusions

Review of the available literature has shown that historically and philosophically, educational facilities are designed as a physical response to the needs of the school, community, and society. In addition, school facilities have evolved in form to match the changing needs expressed by modern society. There is nothing in the literature that leads the researcher to believe that this "form follows function" relationship will not continue into the future.

Literature on future educational facilities, though limited, is currently enjoying a resurgence. The revitalization of interest in future school facilities is a direct result of the need for renovation or replacement in many of today's school buildings. As school districts look to the future of their facilities, an effective and scientific method of gathering and analyzing information will be sought, so that informed decisions in the present will lead to directed and expected implications in the future. Strategic planning, architectural programming, and futures research will provide these methodologies.

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[105] Norman C. Dalkey, Studies in the Quality of Life: Delphi and Decision-Making (Lexington, MA: Lexington Books, 1982), 20.

[106] Fowles, op. cit., 275.

CHAPTER 3

Methodology

This study was designed to examine the societal and environmental factors which will impact education in the future and to determine the effect of these factors on educational facilities. Five iterative rounds of a Delphi survey instrument were utilized in the investigation of these areas. Delphi rounds one and two made up the first phase of inquiry, that being what societal or environmental factors will effect education in the future. Delphi rounds three, four, and five defined the second phase of inquiry, what effects these factors will have on school facilities.

In this chapter are described the sample population, means of data collection, and the individual rounds of the Delphi process. Finally, the methods of recording, analyzing and verifying data are discussed.

Pre-Study

Prior to beginning the actual study, four steps were completed: a thorough review of the literature (Chapter 2); the determination of an initial list of social, technological or environmental futures; the performance of a pilot study (Chapter 5); and the determination of a population and sample groups.

Review of Literatrure

A predecessor to the study, and an anticipatory part of data reduction, was the review of the literature. The review of the literature was intended to accomplish various functions. By reviewing the literature, a basis and credibility for performing the proposed research was determined. Furthermore, it established a focus or boundary for the study, hence reducing the voluminous amount of data which could be generated by qualitative research. Finally, the review of the literature assisted the researcher in determining the pre-study environmental futures which provided impetus to the study.

Social, Technological, or Environmental Futures

Paramount to the study was the belief that education and school facilities are a product of the conditions and influences in which they reside. Changes in economic, ecological, sociological and technological "environments" impact the function of education. Therefore, a clear picture of the future "environment" was necessary if Delphi participants were to accurately forecast future school facilities.

By reviewing the pertinent futures literature from the selected disciplines and by examining the monthly abstracts from the Future Survey Annual from 1989 through 1992, the researcher was able to formulate an initial list of twenty proposed environmental futures which the Delphi participants validated or modified in rounds one and two of the Delphi. The twenty forecasts chosen for inclusion are given below.

1. School districts will turn to private donations and foundations to supplement appropriations from local, state, and federal governments. These funds will not be meant to replace government funds, but to enhance them.

2. Public schools of the future will be called upon to educate not only students from the traditional ages of 5-17, but also older, even retired, adults. This expanded "adult education" role may include weekend or evening programs.

3. Future curriculum content will address the issue of diverse cultural values and languages. School personnel will utilize teaching strategies that stress appreciation, understanding, and the value of other cultures.

4. A greater proportion of tomorrow's students will enter school with one or more "strikes" against them. These "strikes" may include poverty or lower family income, a

single parent household, or a minority heritage with parents of a below-average educational level.

5. Economic differences between double income families and single parent families will increase. One result of this economic inequality will be the development of technological haves and have nots in society.

6. School districts will become social service centers for their communities. Their services will include health and medical care, affordable day care, and job placement.

7. Economic rather than military strength will determine tomorrow's superpowers, and global leadership in science and technology will determine economic strength.

8. Information technology will blur the barrier between work, school, and home, resulting in an indeterminate work/school day.

9. School districts will increasingly utilize business and industry trained professionals as classroom teachers.

10. The United States will continue to move from an industrial based economy to an information based economy where human intelligence, specialized data processing, and biological engineering are the key components.

11. Through computer technology and networking, small companies will be able to compete successfully with large firms. Networks or management teams will replace management hierarchies in most corporations.

12. Distance learning will be used extensively to bring quality, comprehensive learning experiences to all students.

13. The problems exhibited by children born to drug addicted mothers will cause educators to alter the approaches they utilize in educating children. New definitions for achievement may result and categories of special education may be expanded.

14. In the future, promotion between grade levels and graduation will be based upon the individual mastery of educational concepts and not by age. Students will be expected to exhibit mastery of pre-specified outcomes prior to promotion or graduation.

15. There will be a rise in the percentage of students enrolled in alternative schooling programs. These programs will include year-round classrooms, magnet schools in the arts and sciences, and the use of home schooling.

16. There will be a continued movement toward a globalization of economic markets, communications, and finance with an increased foreign ownership of U.S. industries and increased U.S. exports to foreign countries.

17. Computer technology will become an integral part in the diagnosis of student needs, the development of prescriptive instruction, and the monitoring of student progress.

18. Businesses will increasingly demand greater skills of high school graduates in problem solving, communications, and computer literacy.

19. Over half of all large companies (10,000+ workers) will offer some means of formal or informal education for their employees in the future.

20. There will be an increase in public attention to social and environmental issues.

Pilot Study

An abbreviated pilot of this qualitative study was performed during the fall semester of 1990 at the University of Nebraska-Lincoln. The researcher utilized members of the Nebraska Department of Education, University of Nebraska-Lincoln faculty, and regional school administrators as members of a "futurist" sample population. The pilot study was developed as one method of noting and eliminating methodological problems. Pilot study details are discussed in Chapter 5. (See Appendix B and Appendix C for pilot study instrument.)

Population

The population required for this study were reputationally elite authorities on futurism drawn from a variety of disciplines. These authorities were selected on the basis of their multiple nomination to the study and by the non-randomnized process detailed below. Due to the extensive nature of this study, it was decided to utilize two separate sample groups selected non-randomly from the initial population, with one sample group participating in the first portion of the study (rounds one and two of the Delphi) and the second sample group participating in the second portion of the study (rounds three, four, and five of the Delphi).

Reputational Nomination: Round One

To determine the population of futurists, the researcher utilized Kindred's "reputational" approach to selection of significant individuals from a community.[1] The researcher contacted the predominant journals or organizations in each of the fields of economics, energy, ecology, science and technology, communications, business and work, sociology, health and medicine, education, facility planning, general futurism, and architecture, asking the journal editors or organization presidents to name reputationally elite individuals with interests in futurism, education, and architecture. Twenty-two journal editors or organization presidents were contacted by mail (see Appendix A for letter) with fifteen responses (68 percent response rate). The seven non-responding journal editors were then contacted by telephone for responses. Five of these editors responded by telephone (23 percent). The remaining two editors failed to respond to the initial mail contact and to three attempts at phone contacts. Total response rate was 91 percent. The twenty responding journal editors and organizational presidents made 88 nominations, comprising 64 separate individuals. This concluded the first round of reputational nomination.

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[1] Leslie W. Kindred, Don Bagin, and Donald R. Gallagher, The School and Community Relations (Englewood Cliffs: Prentice-Hall Inc., 1984), 24.

Reputational Nomination: Round Two

The 64 individuals nominated by the journal editors or organizational presidents were contacted by mail and asked to nominate other reputationally elite individuals with interests in architecture, futurism, and education (see Appendix A for letter). Of the 64 individuals contacted, 46 responded by mail (72 percent response rate). Non-respondents were not contacted with follow-up telephone calls or letters. The second round of reputational sampling produced 192 nominations, comprising 77 individuals not previously nominated. This concluded the second round of reputational sampling. Total for the first two rounds were 280 nominations comprising 165 separate individuals.

Reputational Nomination: Round Three

The 77 new nominees from round two were contacted by mail and asked to nominate other reputationally elite individuals with interests in architecture, futurism, and education (see Appendix A for letter). Of the 77 individuals contacted, 52 responded by mail (68 percent response rate). Non-respondents were not contacted with follow-up telephone calls or letters. The second round of reputational sampling produced 211 nominations, comprising 122 individuals not previously nominated. This concluded the third round of reputational sampling.

Totals for the three rounds of reputational sampling were 163 letters sent requesting nominations, with 118 responses for a 72 percent response rate. There were 491 total nominations comprised of 263 separate individuals, with 228 nominations being duplicates of those previously nominated. In the three combined nominating rounds, 47 individuals were nominated twice, 25 individuals were nominated three times, 17 individuals were nominated four times, 13 individuals were nominated five times, 3 individuals were nominated six times, 1 individual was nominated seven times, and 1 individual was nominated eight times.

Sampling

The sampling procedure was non-randomized, based upon the frequency with which the individual's name (nomination) appeared in the general population. Those persons named most often became the first selected for the sample.

Since two separate samples were needed, a division in the sampling process was necessary. This division was again non-randomized. The most frequently nominated individual was selected for the second sample (for use in rounds three through five), the second most frequently nominated individual was selected for the first sample (rounds one and two). Selection then alternated between samples one and two. This method of selection resulted in a higher probability that the most prominent members would be be selected first, with a "general equality" of division between each sample.

The individuals selected for use in the study were those 60 individuals who were reputationally nominated three or more times. Of the 60 selected individuals, 22 were primarily from the field of architecture or facility planning, 20 were primarily from education related fields, and 18 were from fields primarily related to the description or study of the future. From this population, two 30-member samples were selected. The first sample was used in the first two rounds of the Delphi to generate and validate "environmental" factors which could impact education. The second sample was utilized in the third through fifth rounds, to generate possible futures for school facilities.

Two requirements were determined prior to the study as necessary for both sample groups: the initial size of each sample group had to be at least twenty-five persons and each sample must consist of at least one member from the targeted disciplines. Both of these requirements were met by the reputational sampling process.

Data Collection

Data were collected from one primary source, a five-round Delphi survey instrument. The Delphi survey instrument used for data collection in this study was unusual for a qualitative research project. Traditional methods of collecting qualitative data directly involve a human component, for instance, when the researcher gathers data through the use of direct observation or interviews. In this study, an iterative survey instrument was used for data collection, thereby making the human component in data collection an indirect relationship, with the human element being primarily data management and development of conclusions.

Two 30-member panels of noted futurists, architects, and educators were utilized in the generation of data. In the first phase of inquiry, data concerning social and technological environmental futures were collected from a purposefully sampled group of reputationally elite futures experts. This phase of the study used a survey instrument, with feedback, to collect data from participants over the first two rounds of the Delphi.

The second source of data was obtained from the second panel of reputationally elite futures experts. Panelists were asked to respond to an open-ended survey instrument regarding the effect of social and technological futures on the characteristics of future school facilities. Three rounds of the instrument were given, with feedback after the first and second round.

Procedures: Delphi Iterative Rounds

This study consisted of five iterative rounds of a Delphi survey instrument. Rounds one and two were concerned with social and technological environmental futures that effect future education; and rounds three, four, and five were concerned with the qualitative generation of future educational specifications based upon these environmental futures. The methodology of this study (iteration of Delphi rounds and subsequent analysis) is graphically illustrated in Figure 3.1. The relationship between the study methodology and the components of data analysis are further depicted by Miles and Huberman's Flow Model[2], also illustrated in Figure 3.1.

Delphi Round One: Social and Technological Futures for Education

Utilizing the twenty future forecasts extracted from the monthly abstracts of the 1989 through 1992 Future Survey Annual, the researcher was able to expand the forecasts to include a descriptive scenario that gave detail to the original forecast. These scenarios and predictions served two purposes: when placed in the survey instrument, the scenario gave all participants a similar frame of reference; the exact forecast which followed ensured that all participants were focused upon the same question.

In round one of the survey, participants were asked to read the twenty initial future scenarios and forecasts and then rate the forecasts individually as to probability of occurrence on a six point Likert scale. The Likert scale ranged from highly probable to highly improbable. Participants were also asked to rate when the given forecast would receive widespread acceptance; from never, today, or in five-year intervals up to fifty years in the future. The first round survey instrument is given in Appendix D. The researcher collected and tabulated responses from the survey instrument and developed descriptive statistics (group mean and frequency distribution) that were used as feedback in the next round of the survey.

At the end of the first round survey instrument, participants were asked to incorporate expertize from their own backgrounds by adding additional forecasts which they felt were pertinent but had not been included. The additional forecasts were compiled, reduced when similar, then included as feedback in the second round of the Delphi survey.

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[2] Matthew B.Miles and A. Michael Huberman. Qualitative Data Analysis: A Sourcebook of New Methods (Beverly Hills, CA: Sage Publications, 1984), 22.

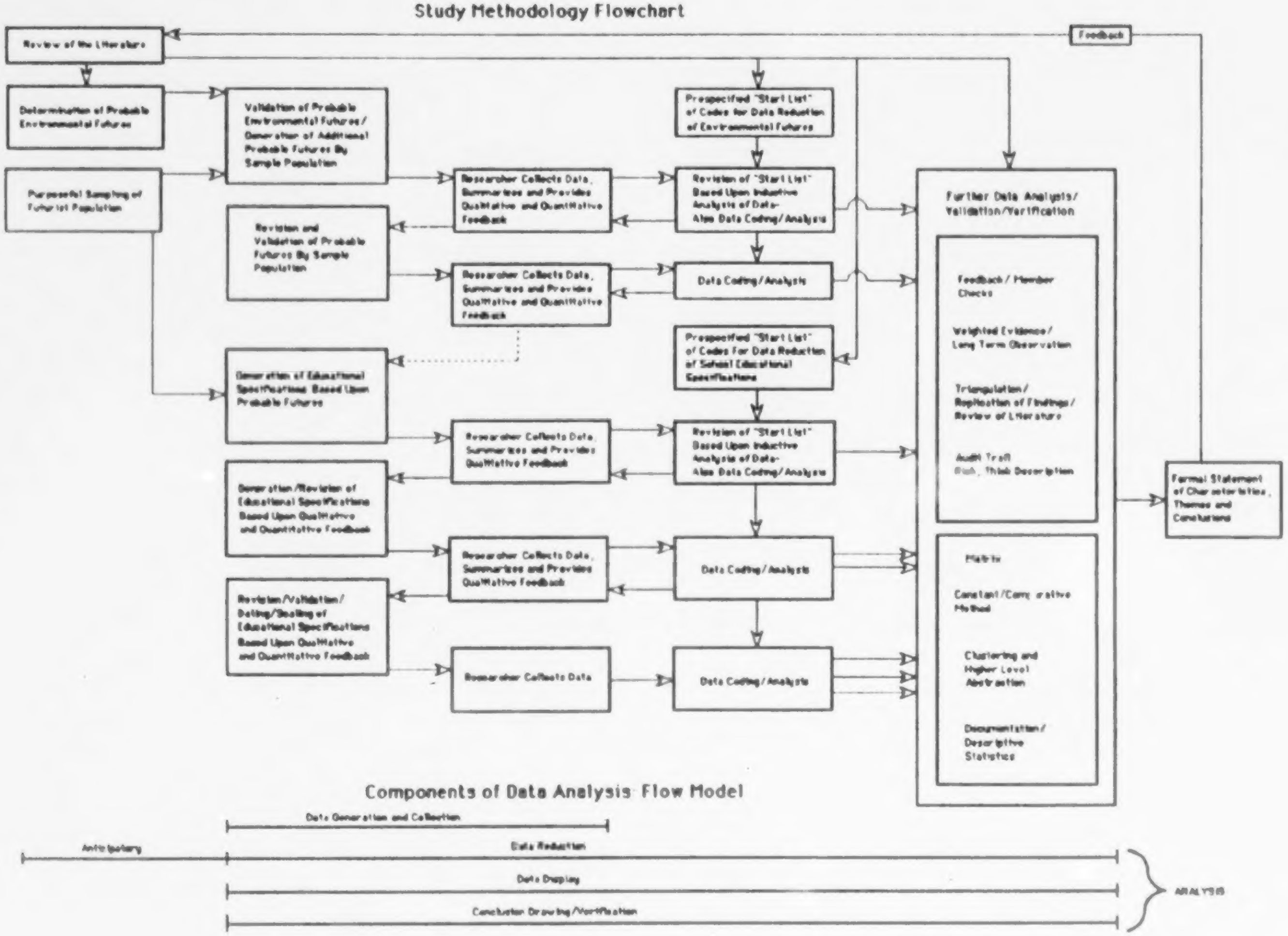
Study Methodology Flowchart
Review of the Literature
Feedback
Determination of Probable Environmental Futures
Validation of Probable Environmental Futures / Generation of Additional Probable Futures By Sample Population
Purposeful Sampling of Futurist Population
Prespecified "Start List" of Codes for Data Reduction of Environmental Futures
Researcher Collects Data, Summarizes and Provides Qualitative and Quantitative Feedback
Revision of "Start List" Based Upon Inductive Analysis of Data- Also Data Coding/Analysis
Revision and Validation of Probable Futures By Sample Population
Researcher Collects Data, Summarizes and Provides Qualitative and Quantitative Feedback
Data Coding/Analysis
Further Data Analysis/ Validation/Verification
Feedback / Member Checks
Weighted Evidence / Long Term Observation
Triangulation / Replication of Findings / Review of Literature
Audit Trail Rich, Thick Description
Prespecified "Start List" of Codes For Data Reduction of School Educational Specifications
Generation of Educational Specifications Based Upon Probable Futures
Researcher Collects Data, Summarizes and Provides Qualitative Feedback
Revision of "Start List" Based Upon Inductive Analysis of Data- Also Data Coding/Analysis
Generation/Revision of Educational Specifications Based Upon Qualitative and Quantitative Feedback
Formal Statement of Characteristics, Themes and Conclusions
Researcher Collects Data, Summarizes and Provides Qualitative Feedback
Data Coding/Analysis
Matrix
Constant/Comparative Method
Revision/Validation/ Dating/Sealing of Educational Specifications Based Upon Qualitative and Quantitative Feedback
Researcher Collects Data
Data Coding/Analysis
Clustering and Higher Level Abstraction
Documentation/ Descriptive Statistics
Components of Data Analysis Flow Model
Data Generation and Collection
Anticipatory
Data Reduction
Data Display
Conclusion Drawing/Verification
ANALYSIS

Figure 3.1

Graphic Representation of Study Methodology

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Delphi Round Two: Social and Technological Futures for Education

After receiving the feedback from round one, second round participants were asked to reread the future forecasts and then rerate them as to probability of occurrence and time to widespread acceptance (see Appendix E for copy of round two survey instrument). In addition, the group of participants were asked to rate the new forecasts given by individual participants of the first round. Finally, the participants were again asked to contribute any new forecasts which they felt were pertinent to the study.

The researcher retabulated responses to the second round, again developing statistical measures of mean and frequency distribution. After round two, any forecast with an average probability of occurrence falling in the range of somewhat probable to highly improbable were dropped from consideration for round three of the survey instrument.

Rounds one and two of the Delphi survey instrument were designed to accomplish three objectives: to validate the original forecasts given as probable or improbable; to generate further forecasts based upon the participants own expertise or from brainstorming from the ideas of other participants; and to develop consensus as to a common body of probable environmental futures from which the participants in later rounds could forecast educational specifications.

Delphi Round Three: Architectural Programming for Educational Futures

In the third round of the Delphi survey, the second sample of futurists began the second portion of the study designed to generate initial forecasts of educational specifications based upon the probable environmental futures (forecasts) of rounds one and two. In round three the new sample members received qualitative information from the results of round two. The information given to round three participants was in the form of scenarios and forecasts only. In addition, each participant received a definition and description of educational specifications. From this information, participants were asked to respond to one question: "Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?" Participants were asked to write a brief description of each characteristic. In addition, participants were allowed to add additional scenarios and forecasts to the survey which they felt were pertinent but omited. These new forecasts were compiled and included in round four of the survey instrument. The third round survey instrument is given in Appendix G.

The researcher collected the results of the third round, compiling a summary of participant's responses (educational specifications), which were then used as qualitative feedback for participants in round four. Due to the uniqueness of many of the responses, none of the responses were condensed and all responses were provided as feedback to the participants in the fourth round. No attempt was made to provide quantitative feedback to the participants in the fourth round, such as frequency of responses related to a certain idea or characteristic. This decision was based upon the belief that purely qualitative feedback would provide the impetus for the brainstorming of new ideas, while quantitative feedback at this point would prematurely result in the forced consensus of ideas as participants began to compare their ideas to the group norm.

Through qualitative data analysis the researcher began to develop emergent themes that would be compared to round four themes and ultimately be used as a basis for the round five survey instrument. The methods of qualitative data analysis used included coding of response data (facilitated by a computer relational database), the development of themes through the use of "clustering" and matrix techniques, and the use of the constant/comparative method in the development of themes. These methods of qualitative data analysis are detailed further in this chapter.

Delphi Round Four: Architectural Programming for Educational Futures

In round four, participants received the initial forecasts and qualitative summaries of responses to the third round, and were asked to respond to the question: "Having read the first round responses to this forecast, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?" The fourth round survey instrument is given in Appendix H.

Participants could respond in similar fashion to round three, or, and this was encouraged, they could brainstorm new characteristics and higher order concepts from the ideas of others. The researcher again collected responses, compiling them as he had following the third round. Through qualitative data analysis the researcher developed themes from the round four responses. Analysis of the round three and round four themes through constant/comparitive methods resulted in themes that were then used as a basis for the round five survey instrument.

Round four of the instrument, because it permitted participants to view the responses of others, had two objectives. The round four instrument generated new responses of higher intellectual order (brainstorming), and it also began initial development of group consensus, as participants rejected ideas of limited value and retained in their answers those they consider worthy.

Delphi Round Five: Architectural Programming for Educational Futures

In round five of the Delphi, the study participants did not receive the initial forecasts given in rounds three and four, but instead received a series of twelve themes that had emerged from the data. Underneath each of the twelve themes were a set of programming characteristics that emerged from the data analysis and that supported that particular theme. Participants were asked to rate each set of characteristics (organized by the twelve themes) on a six point Likert scale, ranging from no probability to high probability of occurrence.

In addition, participants were asked to rate when each set of characteristics would become widely accepted. Participants were encouraged to write any additional comments that they had at the end of the survey. The researcher collected responses, summarizing them quantitatively. This concluded the final round of the Delphi survey. Through the use of the Likert scale and the timeline, the final round of the survey was designed to validate the themes and generate group consensus. The fifth round survey instrument is given in Appendix J.

Delphi Instrument Design

The researcher realized a few limitations in the method of data collection and generation that he utilized. First, any characteristic generated in the later rounds of the Delphi had only a limited opportunity for group response. This limitation was necessary because the study was designed to ask participants to validate previous responses by virtue of their later round responses as well as generate new characteristics, a process which was time consuming. To increase the number of Delphi rounds so that all ideas could receive several rounds of feedback would have resulted in a high attrition rate. Secondly, a possibility existed that by attrition, one of the targeted disciplines could lose representation within the sample group. The researcher's response is that if a participant stayed in the study for only one round, the knowledge or insights produced by that participant would remain in the study and could not be lost by their attrition. The contributed knowledge of that person and their discipline remained.

Data Recording

Recording "raw" data from a qualitative study can be an extensive and arduous task. Traditionally, the transcripts of interviews or "field notes" from direct observations are typed in a verbatim manner. From these transcripts, the process of data reduction begins. Reducing data from a qualitative study refers to the systematic selection, focusing, transforming, abstracting, funnelling or clustering of written or verbal text in such a way that conclusions can be developed and verified.

In this study, the returns from the Delphi survey instruments performed the function of the "field note," that being, to document verbatim the collected data. From this documentation, preliminary analysis and further recording of data occured. It should be noted that the succeeding rounds of Delphi with feedback, not only were a process of documentation, but also a means by which data were analytically, inductively, and statistically reduced for the drawing of conclusions.

Data Analysis

Data analysis in qualitative research does not fit the norm associated with most conventional research proposals. Analysis of the data is not the distinct culmination of the research process often associated with quantitative research. Instead, qualitative data analysis is an interrelated, constant, and simultaneous activity. Analysis of qualitative research "begins with the first interview, the first observation, the first document read. Emerging insights, hunches, and tentative hypotheses direct the next phase of data collection, which in turn leads to refinement or reformulation of one's questions."[3] In Figure 3.1, Miles and Huberman graphically depicted the four simultaneous and on-going processes that they associate with qualitative data analysis: data collection, reduction, display, and conclusion drawing/verification.[4]

Qualitative data are a source of well-grounded, rich, thick description. Qualitative analysis explains processes and problems in their natural context, preserves a sense of chronology, and provides the possibility for the discovery of new theoretical ideas.

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[3] Merriam, op. cit., 119.

[4] Miles and Huberman, op. cit., 22.

Quantitative data provides a means of statistically comparing, relating, or describing. This study generated both qualitative and quantitative data, and in a manner that complimented each other and the analysis process.

Five strategies to data analysis were targeted for use in this study: coding of response data with marginal codes, the development of themes through the use of "clustering" and matrix techniques, the development of descriptive statistics following Delphi rounds, and the use of the constant/comparative method in the development of themes and theories.

Data Analysis by Coding

The first and most time-consuming step to data analysis resulted from the placement of "marginal and key word codes" with each participant's responses. Prior to the study, a "start list" of these analytical and descriptive attributes (codes) were developed. This "start list" was open for modification as new attributes emerged from the data. Preliminary analytical codes included, but were not be limited to, the factors of Pena's information index, the steps (goals, facts, concepts, needs, problem statement) and the considerations (function, form, economy, time and energy).[5]

After each round of the survey, the response data was coded in or more of three fashions--key word coding (descriptive), marginal coding (interpretive and explanatory) or statistical coding (probability and years to occurrence). During data analysis, these codes were used to reduce data and organize responses for further analysis.

Key word coding referred to the placement of a descriptive code with each participant's Delphi response. The key word or key words succinctly described the contents of that particular response. Key words assisted the researcher in developing generalizations, matrix categories, and low level analysis.

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[5] William M. Pena, with William Caudill and John W. Frocke, Problem Seeking-An Architectural Programming Primer (Boston, Cahners Books International Inc, 1977) 36.

Marginal coding referred to the placement of tentative analytical codes with each participant's Delphi response. These codes assisted the researcher in developing tentative categories, themes, and upper level analysis.

Statistical coding referred to the information generated by the participant's responses concerning probability of occurrence and years to occurrence. Statistical coding assisted the researcher in determining measures of group consensus and intensity of feeling towards a subject (group means and frequency distribution).

Through these "codes" and the inductive emergence of categories from the data, the responses from each round were placed in a computer relational data base file, a Macintosh application entitled 4th Dimension. This data base allowed responses to be searched and sorted according to researcher's needs, either by marginal and keyword codes or by researcher developed categories. These codes permitted the researcher to assimilate all entries of similar nature, thus facilitating the management of data through matrix and clustering techniques and the inductive drawing of conclusions, theories, and themes.

Matrix

Through the use of coding and the inductive emergence of categories from the data, the relevant data from each round was charted upon an attribute-by-information matrix. This matrix permitted the charting of data by initial categories and a coded summary, paraphrase, or direct quote. At the bottom of the matrix, emerging themes and theories were noted. The matrix was used by the researcher as a visual means of organizing data and conceptualizing themes. Matrix development was enhanced considerably by the use of coding and clustering techniques and the 4th Dimension relational database program.

Clustering

Clustering refers to the process of understanding a phenomenon by grouping, then conceptualizing, ideas that have similar patterns or characteristics.[6] Clustering was a logical outcome of the matrix format and 4th Dimension sorting, as ideas were grouped together by codes. Clustering did more than generate concepts from one category of data. By continued clustering, larger forms and levels of data were grouped. This result was movement to higher order abstraction and analysis.

Descriptive Statistics

Following rounds one, two, and five of the Delphi instrument, descriptive statistics (mean and frequency distribution) were generated concerning the scaled responses to the characteristics described. New characteristics could not be described statistically until the following round. These statistics served several purposes: to measure the group's "intensity of feeling" towards a subject; to describe the distribution of the group's responses; and in the case of rounds one and two to generate feedback for participants in the following round. Analysis of the statistics permitted the researcher to place characteristics in a longitudinal framework of anticipated need and impact, and to obtain insights for the intensity which the individual or group felt about a specific topic.

Constant Comparative Method

The constant comparative method of developing concepts, hypotheses, or themes referred to the process of comparing data to an emerging theory.[7] From the original data, a theory or thematic framework was developed, which guided the collection of further data. As additional data were gathered, it was compared to the original theme. The comparison resulted in the modification and refinement of the theme, as it attempted to continually integrate greater amounts of data under its "umbrella." Ultimately, a smaller set of higher level themes was the result. The constant comparative method was a strong complement to both the matrix and clustering techniques in that all three strove for the development of higher order concepts, themes, and analysis of the data.

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[6] Miles and Huberman, op. cit., 219.

[7] B.G. Glaser and A.L. Strauss, The Discovery of Grounded Theory (Chicago: Aldine, 1967), 110.

Verification of Data

The detailed documentation of systematic data analysis procedures assisted the researcher in inductively obtaining valid findings, documentation and findings which theoretically assures that another competent researcher working independently with the same sample population and analysis procedures would not come up with contradictory findings.

All research, be it qualitative or quantitative, must be concerned with producing consistent, dependable, reliable, and valid results. By following the accepted research procedures found in the literature for internal validity, reliability, and external validity, the researcher enhanced the measure of each of these in his study.

This section describes internal validity, reliability, and external validity, along with noting techniques from the literature for their assurance. Following this, techniques selected from the literature as appropriate for this study are described.

Internal Validity

Internal validity deals with how well a researcher's findings match reality. Realizing that qualitative information does not speak as if for itself but must be interpreted, Ratcliffe suggested that it is the researcher's experience that is being interpreted and not reality itself.[8] From this, Merriam suggested several strategies to help researchers enhance internal validity: triangulation, member checks, long-term observations, peer examination, participatory modes of research, and clarifying researcher's biases.[9]

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[8] J.W. Ratcliffe, "Notions of Validity in Qualitative Research Methodology," Knowledge: Creation, Diffusion,Utilization, 1983: 150.

In addition to these techniques, Miles and Huberman noted several strategies researchers use to verify their conclusions and enhance the validity of their findings:

> "checking for representativeness; . . . checking for researcher effects; . . . triangulating; . . . weighting the evidence; . . . making contrasts/comparisons; . . . checking the meaning of outliers; . . . using extreme cases; . . . ruling out spurious relations; . . . replicating a finding; . . . checking out rival explanations; . . . looking for negative evidence; . . . getting feedback from informants.[10]

Reliability

Reliability refers to the replicability of one's findings. In other words, if the study was repeated by another competent researcher, with the same sample population and analysis procedures, would the researcher come up with the same results? Lincoln and Guba suggested alternative terms for reliability. Instead of asking researchers to get the same results, they suggest that researchers agree that the results make sense, are therefore consistent and dependable.[11] Merriam noted three techniques which researchers can use to enhance reliability: triangulation, leaving an audit trail, and having the investigator explain their position and assumptions.[12]

External Validity

External validity refers to the ability of a researcher's findings to be applied to other situations. In addition to increasing the number of cases used for the study, Merriam suggested the following strategies for enhancing generalizability: provide a rich, thick description which others may use as a base; describe how the topic compares to others of the same class; and conduct a cross-site or cross-case analysis.[13]

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[9] Merriam, op. cit., 169.

[10] Miles and Huberman, op. cit., 230-248.

[11] Y.S. Lincoln and E.G. Guba, Naturalistic Inquiry (Newbury Park, CA: Sage Publications, 1985), 288.

[12] Merriam, op. cit., 172.

Techniques for Validity and Reliability in the Study

Several techniques by Merriam and also Miles and Huberman have been selected as appropriate for this study. They are: triangulation/replicating a finding; getting feedback from informants/member checks; weighted evidence/long-term observation; ruling out spurious relationships; audit trail; and rich, thick description.

Triangulation

A pilot study using a similar though abbreviated methodology to this study was performed in the fall of 1990 at the University of Nebraska-Lincoln. The pilot study acted as one form of cross verification of results and conclusions, a process that Webb, Campbell, Schwartz, and Sechrest term "triangulation."[14] Miles and Huberman stated that triangulation was expected "to support a finding by showing that independent measures of it agree with it, or at least, don't contradict it." In addition, they advised researchers to "be on the lookout for a new source of data--a new informant or class of informants, another comparable event or setting. A new source forces the researcher to 'replicate' the finding in a place where, if valid, it should reoccur."[15]

By utilizing the pilot study as a comparison, the researcher hoped to triangulate and support the findings of this study. In addition, comparison of study results with a thorough review of the literature was done with the expectation that they would not contradict.

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[13] Ibid 177.

[14] E.J. Webb et al., Unobtrusive Measures (Chicago: Rand McNally, 1965).

[15] Miles, op. cit., 235.

Feedback From Informants/Member Checks

One means to increase validity is to take data back to people from whom they were collected and ask them if the results are plausible. Miles and Huberman strongly advocated this strategy but cautioned the researcher about introducing bias to the study. "Feeding things back in the course of a study may change informants' behaviors or perspectives."[16]

The use of successive rounds with feedback in the Delphi can serve as one means of member checking. As each round progresses, participants receive more relevant feedback which by their answers, they verify or "check." An implausible characteristic or incorrect concept would immediately receive low acceptance and therefore be rejected. In a study of this type, a change in informant perspective is not only appropriate but perhaps even desirable as successive rounds occur.

Weighted Evidence/Long-Term Observation

Merriam suggested long-term or multiple observations as one means of increasing validity.[17] If one can accept the argument of each round of the Delphi as being an observation, then this would be accomplished in this study. In addition, Miles and Huberman noted there are certain circumstances when some data may be stronger or weaker than others. One form of stronger data is that which is collected later in a study or after repeated contact.[18] In this study, the final rounds of the Delphi were weighted as stronger data than the earlier ones. Such techniques are also consistent with theme development, as a theme is expected to gain strength and higher order over time, based upon constant/comparative methods. The weighted emphasis of later rounds of the Delphi can be graphically noted by double and triple lines in Figure 3.1.

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[16] Ibid., 242.

[17] Merriam, op. cit., 169.

[18] Miles, op. cit., 236.

Audit Trail

By documenting in detail the methods used to collect, analyze, and describe data, the researcher leaves an "audit trail" from which the reader or another researcher can track the data analysis or double check findings.[19] By outlining procedures clearly enough, independent researchers can replicate the study and corroborate it.

Rich, Thick Description

Finally, Lincoln and Guba suggested providing a rich, thick description "so that anyone else interested in transferability has a base of information appropriate to the judgement."[20] In this study, the researcher included each of these methods in the verification of the data and in his conclusions, thereby strengthening the results of the study.

Presentation of Results

The focus of this study has been designed to initially determine probable environmental futures which will impact education, then develop themes and characteristics concerning how these environmental futures will impact the future of educational facilities.

A theme has been described as an "overarching concept or theoretical formulation that has emerged from the data analysis."[21] Themes are ordinarily at a level of conceptualization and abstractness that can be generally applied to more than one situation. As such, "themes" are appealing to professional audiences and academics. Characteristics are topical. They describe rather than conceptualize and are therefore appealing to practitioners. Both themes and characteristics are relevant expectations of this study.

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[19] Lincoln and Guba, op. cit., 172.

[20] Ibid., 124-125.

[21] Merriam, op. cit., 190.

The findings of this study are presented in several sections: survey results, summary, conclusions, and recommendations. The first section (Chapter 6, Results) documents the survey instrument results from each of the five rounds. When appropriate, descriptive statistics were used to define consensus towards a topic and place it within time frame. The participants in the study and return rates are noted.

The second section (Chapter 7, Summary, Conclusions, and Recommendations) describes the results from the analysis of the data. The emergent themes or propositions from the matrix, data coding and clustering processes are described in narrative form. In this section, each research question is answered at length in narrative form. Finally, recommendations are made by the researcher for the appropriate audiences and for future researchers in this field.

CHAPTER 4

Compatibility of Research Methodology and Research Topic

There exists in educational facility planning a need for a clearer view of future school buildings. The Delphi process, chosen as an appropriate research tool for this study, has been historically effective in forecasting futures. Furthermore, qualitative research is noted as an inductive means to understand, discover, describe, or to generate hypotheses. In the emerging field of future school architecture, such attributes are highly attractive. However, the purpose for conducting this study was not merely to discover but to also verify the findings. For this reason, a more "systematic" approach to data collection and analysis was utilized.[1]

In the first chapter, the Delphi process and the qualitative paradigm were introduced. This chapter expands upon that introduction by examining the fit of the qualitative paradigm and the Delphi process to the research topic.

Fit of the Qualitative Paradigm to the Topic

In Chapter 1, the purpose for conducting this study was noted as to develop a list of societal or environmental factors which may impact education and future educational facilities; determine, based upon these anticipated societal or environmental factors an architectural program of probable educational specifications (characteristics) for future educational facilities; develop a descriptive future of educational facilities as a result of these anticipated educational specifications; and determine underlying themes or propositions concerning the development of future educational facilities.

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[1] Mary Lee Smith, "Publishing Qualitative Research," American Educational Research Journal no. 2 (1987): 179.

The decision to use a qualitative design to study educational facility futures was based upon the researcher's goal of insight, discovery, and description, and not quantitative research's focus of hypothesis testing. Given Miles and Huberman's description of a "case" as a "single bounded context,"[2] the following description was appropriate. Merriam described the four essential characteristics of case study (qualitative) research as: particularlistic, descriptive, heuristic, and inductive.[3] This study met each of these essential elements as described in the following section.

Particularlistic

The focus of qualitative research is on a particular situation, event, program, or phenomenon. Shaw described this as concentrating "attention on the way particular groups of people confront specific problems, taking a holistic view of the situation. They are problem centered, small scale, entrepreneurial endeavors."[4]

This study was designed to examine a specific problem, the future of education and educational facilities, as predicted by a select panel of futurists. Though the focus may skirt the "way" futurists predict school facilities to the "what" they predict, the proposed study is bound by a singular, problem-centered context.

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[2] Matthew B. Miles and A. Michael Huberman, Qualitative Data Analysis: A Sourcebook of New Methods (Beverly Hills, CA: Sage Publications, 1984), 151.

[3] Sharan B. Merriam, Case Study Research in Education: A Qualitative Approach (San Francisco, CA: Jossey-Bass Inc., 1988), 11.

[4] K.E. Shaw, "Understanding the Curriculum: The Approach Through Case Studies," Journal of Curriculum Studies 1978: 2.

Descriptive

Taken from anthropology, the term "rich, thick description" has become associated with a complete, literal narrative of the problem being studied. Instead of reporting findings in statistical or numerical data, "thick description" stresses the use of literary means to describe findings, analyze situations, and present documentation, often through the actual quotes of the participants.

Though the Delphi process utilizes measures of central tendency as feedback to participants, and though the results of this study included such descriptive statistics, the use of these measures need not be the demise to the "rich, thick description" of the study results. Qualitative data analysis often involves the categorizing of data in order to compare and contrast. The placement of data into these categories or matrixes permitted the researcher to manage and reduce the extensive volume of qualitative data to a workable and analyzable level. The descriptive statistics derived from these comparisons do not detract from the "thick description" but helped the researcher to better analyze and verify the data, thus complimenting the narrative.

The function of statistics in this study was to describe, manage, and analyze. However, the investigative and inductive nature of this study was such that the eliciting of images, descriptions, or quotes could be more powerful and illuminating than their statistics. For this reason, the emphasis on reporting results was narrative, complimented by the statistical.

Heuristic

Heuristic means that the study should clarify the reader's knowledge, meaning, and understanding of the problem being studied. Stake summarizes this as "previously unknown relationships and variables can be expected to emerge from case studies leading to a rethinking of the phenomenon being studied."[5]

The development of educational buildings as a distinct science and architectural expression is fairly recent, dated by Castaldi as mid-twentieth century.[6] As a new field, the formulation and dissemination of information concerning this topic has been limited. It is felt that this study illuminated some of the previously unknown factors which could make future facilities more appropriate for their educational function. The results will assist educational facility planners, school officials, and architects in the understanding of, and the planning for, the unique relationship between education and school facilities.

Inductive

Qualitative research relies on inductive reasoning when analyzing data. Preconceived hypotheses are not experimentally validated; instead, concepts, hypotheses and themes are expected to emerge from data itself. The boundaries of qualitative research (and this study) are focus driven, not prior set .

This study was designed to explore the junction of two fields, one which has a limited literature base, school architecture, and the other which little is truly known, the future. Because of this, few prior concepts or hypotheses exist. The few tentative generalizations that the researcher began with evolved as the study progressed, and a richer understanding of the topic was developed. The analysis of data generated emerging themes, concepts, and characteristics.

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[5] R.E. Stake, "Case Study Methodology: An Epistimological Advocacy," Case Study Methodology in Educational Evaluation, ed. W.W. Welsh, Proceedings of the 1981 Minnesota Evaluation Conference, Minneapolis, Minnesota Research and Evaluation Center, 1981, 47.

[6] Basil Castaldi, Educational Facilities: Planning, Modernization, and Management (Boston: Allyn and Bacon, Inc., 1987), 7.

Fit of the Delphi Process to the Focus

In Chapter 2, the Delphi process was noted as one method of forecasting the future. Sackman described the result of a Delphi study as "a presentation of observed expert concurrence in a given application area where none existed previously."[7] In the relatively unexplored field of educational facility futures, this method of qualitative and quantitative exploration seemed particularly germane.

Armstrong noted three features pertinent to Delphi study:

> 1) the respondents are experts in the subject area,
> 2) there is more than one round--that is, the experts are asked for their opinions on each question more than one time,
> 3) controlled feedback is provided. Respondents are told about the group's responses on the preceding rounds.[8]

Adding to this list, Fowles describes the Delphi process as particularly useful in the following circumstances:

> 1) the problem does not lend itself to precise analytical techniques but can benefit from subjective judgements on a collective basis,
> 2) the individuals who need to interact cannot be brought together in a face-to-face exchange because of time or cost constraints. Further, a conventional conference tends to be dominated by particularly strong personalities or to give rise to an undesirable bandwagon effect.[9]

Finally, Fowles expanded his comments with advice for the researcher using the Delphi process: "the most important advice to be given the potential user is to suit the method to the problem, not the problem to the method."[10] Similar flexibility has been suggested by qualitative researchers, in that there is no "fixed or absolute" method of data collection. In fact, the method of data collection and even analyzation may change as new themes emerge from the data. The features presented by Armstrong and Fowles are appropriate to the study of educational facility futures as presented in the following section.

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[7] Harold Sackman, Delphi Critique: Expert Opinion, Forecasting, and Group Process (Lexington: D.C. Heath and Company, 1975), 6.

[8] J. Scott Armstrong, Long Range Forecasting: From Crystal Ball to Computer (New York: John Wiley & Sons, Inc., 1985), 117.

[9] Jib Fowles, ed., Handbook of Futures Research. (Westport: Greenwood Press, 1978), 275.

[10] Fowles, op. cit., 275.

Expertise in the Subject Area

In this study national experts on the future were used as a sample population. Drawn from various fields and disciplines (agriculture, economics, energy, ecology, science, technology, communications, business and work, sociology, health and medicine, education, general futurism, and architecture), each of these participants were noted experts in the future of their specialized field. The question of misplaced expertise (futurism and not school facilities) may come to mind. Four assertions must be expressed.

Historically and currently, educational specifications are developed by novices, that meaning local school officials, teachers, and community members, those people with no expertize in school facility planning or architecture. The use of futures experts makes no significant departure from this current practice, with the exception of their insight and knowledge of the world of tomorrow.

Secondly, the use of only school facility architects as a sample population would be self defeating. Their expertise lies in interpreting and transforming a school district's educational specifications into a feasible design or plan, not in predicting the future. The researcher felt that there is greater public acceptance of novices describing the needs and characteristics of school buildings (educational specifications) than there is for architects in forecasting societal futures.

Thirdly, the state directors of educational facilities from the department of education in each state could be used as a sample population. However, their expertise lies in the administration and assessment of school facilities, not in predicting the future.

Finally, expert educational facility planners could be used as a sample population. They have creativity and insight due to their proximity to the problem, and they possess the expertise to recognize the original and feasible. However, their specialization is again such that predicting the future is not their major forte.

If the results of this study are to truly reflect diversity in perspective, then the sample population must include more than just architects, state directors of educational facilities, and school facility planners. This does not mean that these professions did not play an important role in this study; they did. The diversity of the proposed sample population represented the creative force necessary for true insight; the professional architects, facility directors, and planners represented the force necessary for focusing the study to the feasible. Both are paramount to the study.

Successive Rounds and Controlled Feedback

In qualitative research the collection of data is often longitudinal, that meaning taking place over a period of time. In this study, the generation and collection of data over time was a desirable factor. Participants in the study needed time to interact with the ideas of their counterparts and to brainstorm new ideas. It was anticipated that concepts and characteristics of the participants would change with this interaction, reaching greater levels of perception, abstraction, and consensus over time.

In order for interaction to occur between anonymous participants, some form of feedback must be made available to them. Traditionally, feedback from a Delphi study has been quantitative, usually measures of central tendency (median and interquartile range), so that participants could judge their response to the group norm. However, the use of qualitative feedback in predicting futures is not novel, nor is its application to school facilities. Press's Qualitative Controlled Feedback (QCF) process[11] was utilized by

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[11] S.J. Press, "Qualitative Controlled Feedback for Forming Group Judgements and Making Decisions," Journal of the American Statistical Association, 1978: 526-535.

McClanahan in the development of a K-12 educational facility survey.[12] In QCF participants receive qualitative feedback instead of quantitative, and group consensus is neither requested nor implied. Since the focus of this study was not merely group consensus and validation but also discovery--then quantitative and qualitative feedback were given to participants, depending on the focus of that round of the study. The later rounds of the study were expected to generate a group movement towards consensus, while the early rounds emphasized idea generation and discovery. Fowles advice of "suit the method to the problem, not the problem to the method" was taken to heart.

Collective Subjective Judgements

Any study of school facilities must take into consideration the effect of external environments on the design of the building. Educational facilities are not developed in a vacuum, but instead are the product of the sociological and technological environment, the curricular program, and the mission of the school district. To attempt to develop an educational building without consideration of its purpose and context is a project doomed to failure. This study recognized the external influences of the future and then built upon them in the development of tomorrow's school facility needs, ultimately reaching a descriptive consensus of its form.

Face-to Face Interaction

An underlying motive for using the Delphi process in this study was to present a national and expert view of educational specifications instead of the traditional local perspective. In order to do this, national experts in the field, regardless of location, must interact on the central question. Traditional measures of interaction were deemed inappropriate.

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[12] Randy Rae McClanahan, "The Development, Utilization, and Analysis of a Normative Futures Research Method in a K-12 Educational Facilities Survey" (Ph.D. diss., University of Nebraska-Lincoln, 1988).

Excessive time and financial resources would be expended to permit face-to face (conference) interaction. Computer conferencing was considered, but incompatibility of hardware, or lack of, would place restrictions on those capable of being sampled from the population. In addition, anonymity was desired to increase the probability of unhampered creativity and reduce the likelihood of conformity. Related by one researcher was "anonymity and group response allow a sharing of responsibility that is refreshing and that releases the respondents from social inhibitions."[13]

By meeting the characteristics associated with qualitative research and applying them through the Delphi process, this study met the requirements necessary for the qualitative paradigm.

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[13] Norman C. Dalkey, Studies in the Quality of Life: Delphi and Decision-Making (Lexington: Lexington Books, 1982), 21.

CHAPTER 5

Pilot Study

In the fall of 1990 an abbreviated pilot study was performed utilizing a small, purposeful sample of five experts from the following disciplines: elementary school curriculum and instruction, secondary school administration, educational facility planning, architecture, and sociology/family relations.

Methodology (in brief)

This study was designed to incorporate a qualitative research philosophy with a traditionally quantitative research instrument, the Delphi process, in the discovery of educational specifications for future school buildings. The Delphi process consisted of two iterative rounds of an open-ended questionnaire with cumulative group feedback. The members of the study did not know the identity of the other participants.

Data Collection

Data were collected from one primary source, a two-round Delphi survey instrument. In the first round of the Delphi, participants were asked to rate a series of predictions pertaining to education in relation to years to widespread usage and probability of occurrence. In addition, they were asked to respond to an open-ended question regarding the impact of the educational prediction on the characteristics of future school facilities. A sample of this survey round can be found in Appendix B. After the first round, responses were summed and returned as feedback for the second round.

In the second round, participants received quantitative feedback from round one in the form of group means and frequency distributions concerning the the probability and time to acceptance. They were then asked to re-read their previous responses to the open-ended questions concerning impact on educational facilities along with those of the other participants. After reading all previous responses, participants were then asked to choose the one response that captured the essence of the impact on school facilities; or if no single answer captured the full effect of the impact, then re-respond to the question. A sample of this survey round is found in Appendix C.

Data Recording

The responses from each participant to each question were placed in a computer data base application entitled BiblioFile. This data base allowed responses to be searched and sorted according to the researcher's needs, either by quotes, questions, or by categories and codes. The codes permitted the researcher to assimilate all entries of similar nature, thus facilitating the management of data and the inductive drawing of conclusions and themes.

Data Analysis

Five strategies to data analysis were targeted for use in this study: coding of response data with marginal codes, the use of a computer application known as BiblioFile, the use of "clustering" techniques, the development of descriptive statistics following Delphi rounds, and the use of the constant/comparative method in the development of categories.

The first and most time-consuming step to data analysis was associated with the responses generated by the Delphi survey. Preliminary analysis of Delphi responses resulted from the placement of "marginal codes" with each participant's response. These codes initially utilized the categorical information typically associated with architecture, that being goals, facts, concepts, needs, problem statements, and function, form, economy, and time.[1]

In addition, responses were coded as to intensity of consensus, that meaning those responses which all five participants agreed upon were given a numerical value of five, those which four participants agreed upon were given a value of four. Responses were additionally coded as to years till widespread acceptance (five, ten, fifteen, . . .), and probability of occurrence (highly probable, probable, somewhat probable, somewhat improbable, . . .). This system of analysis was selected as the most logical to obtain those ideas or concepts which by consensus were probable or highly probable, to be able to determine when they most logically would occur, and to place them into a qualitative matrix which would link educators and architects in a mutually understandable language.

After the second round, the large amount of data collected necessitated the development of inclusion rules for reducing and analyzing the data. In relation to probability, only those responses marked probable or highly probable were included for further data analysis. Under intensity of consensus, only those responses where two or more participants agreed were included for further consideration. In relation to Pena's information index categories, the categories of facts and needs were dropped from consideration in the coding process as they pertain to quantitative data. However, in a more extensive study utilizing more rounds of Delphi, information pertinent to these categories would become available and appropriate for consideration.

Intensity of consensus and probability of occurrence were the first variables utilized for analysis. The highest rate of consensus for any of the responses was four, even though there were five participants. This result seems consistent with the literature on the

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[1] William M. Pena, with William Caudill and John W. Frocke, Problem Seeking-An Architectural Programming Primer (Boston, Cahners Books International Inc, 1977), 18.

Delphi method, and a consensus rate of five probably would have been obtained had the survey gone to three rounds.

Presentation of Pilot Study Results

Effects on Education

Majority consensus was obtained (rate 4 and high probability) on the belief that minority students would most certainly become a greater percentage of the total school enrollment. In response to the needs of all children, particularly the financial or culturally underprivileged, school districts will begin health and day care programs as a part of their service offerings (3, high probability). Furthermore, children born to drug addicted mothers would redefine curricular and instructional approaches used in education (3, high probability).

Computers received strong support in the diagnosis of student needs, development of prescriptive instruction, and monitoring of student progress (4, high probability). In addition, computers were expected to link teachers, students, and administrators with other schools and data bases (4, high probability).

Future school systems were expected to operate on an extended or year round basis (3, probable), make considerable use of available transportation systems (3, probable) in the operation of magnet schools (3, probable) of which the voucher system would play a part (3, probable). Furthermore, school districts will begin to seek financing (3, high probability) and instructional methods (4, probable) outside of the school itself to supplement and enhance education.

Schools will develop a "community of learning" support network for students that will include mentors, parents, libraries, churches, youth groups, higher education and business (3, high probability). Volunteers will become an important part of the para-professional work force, particularly older, retired volunteers (3, high probability). In addition to their volunteer roles, older, retired adults will seek appropriate education from their local public school (3, high probability).

Peace will become a prominent curricular concern (3, probable) and also the environment (3 high probability).

Effects on Educational Facilities

Educational facilities have long been a reflection of society and the curriculum. The predicted scenarios on educational function will undoubtedly change the form of future educational facilities. This section will detail the perceived changes that can be expected.

Computers. As computers continue to become a more integral part of the educational process, provisions will be made to link homes and school; schools and schools, teachers, students and guidance counselors. Classrooms will increase slightly in size to accommodate additional computer terminals at desks or tables; this could include a changing of traditional seating patterns as one computer will be made constantly accessible for a maximum of every two or three students. Regular classroom testing will be done on classroom computers, with students and teachers knowing results immediately. Deficiencies can be noted by remedial teachers and appropriate work begun the next day. Counselors will receive weekly updates via computer.

Computers and modems will expand the student's access to instruction and school work as students will call in homework assignments (via modem) at night and pick them up printed the following morning at a central computing room. Computer availability will not be limited to the rich; as computer prices decrease, school districts will begin to operate a loan system of small inexpensive computers, much as their current library system.

Computers will expand the communication process between school teachers and administrators at different sites and even school districts as school districts develop networks of expertise and experience.

Obviously, the "networking" of teachers, students, and counselors requires changes in electrical and communicative wiring (including "dedicated" electrical sources). In addition, it requires the change in floor coverings to static free materials. Additional telephone lines will be necessary for extensive modem usage (this may include the transfer of administrative office lines to computer usage after school closes at night). A physical change in classroom size will be necessary to accommodate the increased number of classroom computers. Finally, a "mainframe" or computer software server room will need to be placed in easy access to administrative offices, guidance counselors and the media/library.

Financing, community involvement. As school officials increasingly look to alternative sources of funding for school facilities, joint ventures between the school and community organizations become enticing. Both the school and the community organization could pay for and operate a facility (i.e. a gymnasium located on the edge of the school building with with doors opening into the school and outside to the community; between 8-3 the school operates it, between 3-12 the school closes its doors and the YMCA operates it), similar operations could exist for library, cafeteria, pool, etc."

Vouchers and magnet schools. Other financial considerations include a movement towards the "voucher system" of financing education and the continued development of magnet schools. In each of these considerations, transportation becomes a primary concern. Schools should be located near present, safe systems of transportation; or safe systems rerouted near school districts. Additionally, magnet schools will require the upgrade of learning laboratories and work areas such as industrial education, music, etc., so that they can remain competitive and enticing to a clientele that has a choice or option of where to attend school.

Year-round or extended school programs. In conjunction with joint ventureship is the decision to operate year round or extended hours school facilities. A strong consideration for such a program would be "lighting, structures, and parking that are conducive to safe and secure transportation and usage."

Peace and environmental education. As schools seek to develop an appreciation for the environment and world peace in their curriculum, two design changes will become necessary. Schools will increase the science and social science areas, including areas or facilities for recycling of school/community materials. In addition, flexible learning areas dedicated to distance learning, interactive technology (audio, video, and computer), and class lab activities will be necessary. Audio/visual/computer classrooms where students can interact with classrooms of other schools in other cultures is a strong possibility.

Minority populations. The vast increase in minority populations will require the training and employment of bilingual teachers. More important from an architectural standpoint are the increase in the number of English as a second language (ESL) classrooms, particularly in border states such as Florida, Texas, and California. The growing minority population present other school considerations than just language. Poverty, lack of medical or dental insurance, and broken families will each impact architecture of schools.

Health and day care programs. Joint ventureship between school districts and community organizations will not be limited to athletic or activity programs. As insurance costs rise, as single parent families increase, as the percentage of children born in poverty and deprivation increase, so will the expectations on the local school district. It is highly probable that tomorrow's schools will provide general medical and dental care to the community. Joint ventures between a school district or school districts and medical/dental doctors to provide on site reduced or free care is a possibility.

The increase of single parent families will also place the school district in a situation where they will be forced to provide day care facilities for pre-school age children, or provide before and after school day care facilities for school-aged children. As one participant responded,

> Health/Child care facilities are essential. One area that is needed is a REST area. When children are finished with the school day and go to "Latch Key" (a before and after school program for school children) they continue movement activities. There is no place for children to relax quietly. Some children arrive at "Latch Key" at 6:30 AM and aren't picked up until 6:00 PM. They need a quiet place to nap/rest/slow down.

The need for day and health care is obvious. However, the previous quote exemplifies the need for developmentally appropriate facilities also. Finally, one participant describes his view of the participation of the school in health and day care as:

> one-stop social services as a point of entry for the family: a 'place' that promotes a sense of belonging to pregnant teens; facilities that provide child day care, and promote optimum parenting education for teen parents (both mothers and fathers).

It is clear that the school's acceptance of health and day care as one of their roles will blur the distinction between public/private and school/community.

Community of learning. As schools evolve from educational institutions to community institutions, the development of a "community of learning" becomes a distinct possibility. Under this concept, school/community relations would be enhanced and increased to include an educational support network of mentors, parents, libraries, churches, youth groups, higher education, and business. The joining of community and school resources may have little effect on school facilities, as in the case of business professionals coming into the classroom to teach business concepts to students on an occasional basis. On the other hand, as the school district expands the community of learning to include volunteers as an important part of their para-professional work force, an expectation can be made for a more extensive commitment of time and resources. One population which may be tailor made for such a proposition is the older, retired volunteer. With the advances in modern medicine, retired people often have the health and time (increased lifespan) to devote a portion of their time in giving back to the community. Volunteer participation will require additional planning and meeting rooms, and a small "break area" where retired adults could take breaks from their volunteer activities.

The adult population (including retired adults) will expect more from their local school district than just the education of their children and grandchildren. They will expect adult education programs, community athletic leagues, and activity programs. Though physical space needs will not increase due to the majority of these programs being offered after regular school hours, considerations of safety and transportation previously mentioned are a concern.

Drug effected children. Children born to drug addicted mothers have been found to have severe emotional, physical, and intellectual problems. As these children enter school systems, educators will be faced with curricular, instructional, and disciplinary problems never before faced. As an architectural response to these factors, several areas should be considered: the expansion of resource, remedial, and special education classrooms in number not size; and the inclusion of "time out" rooms as it is anticipated that the inherent problems associated with drug children will interfere with the learning of other students.

Instructional television. In the first round of the Delphi, children's educational television (particularly as run by individual school districts with a limited broadcast area) received a mediocre response. However, in response to the second round, a participant provided a very unique twist to the situation. The participant responded, "While we will see an increase in children/youth programming it is less likely to be district operated than by ESU's (Educational Service Units) or contracted by SDE's (State Departments of Education) with networks such as NETV (Nebraska Educational Television)." This comment may have solicited additional responses had it been available for an additional round of Delphi. It certainly presents the possibility for educational enhancing programming before and after school, with possible use as an inservice tool (including interactive television) in sparsely populated areas.

Summary

The following represents a summary of probable futures which will affect education.

1) Increased minority student population.

2) Development of school health and day care programs.

3) Development of better software and networking systems to effectively link:

  a) diagnosis, instruction, grading, remedial instruction, counseling;

  b) schools and homes;

  c) classrooms with classrooms in other schools and cultures;

  d) classrooms with national data bases; and

  e) school districts with other school districts.

4) Voucher system of financing education.

5) Magnet schools.

6) Extended year or year-round schools.

7) Increased reliance upon public transportation systems.

8) Peace and environmental concern as a part of the curriculum.

9) Development of strong school/community relations through:

  a) joint ownership and operation of school facilities;

  b) instructional partnerships between the school and community experts;

  c) increased use of community volunteers as paraprofessionals, particularly retired adults; and

  d) adult educational/activity offerings at night or on weekends.

10) Children born to drug addicted mothers will be emotionally, physically, and intellectually impaired.

From these probable futures, the following architectural responses can be anticipated.

1) The inclusion of separate electrical services to parts of a school building for computer operations.

2) Additional telephone lines for computer modem use.

3) Larger classroom areas to handle small group tables and computers instead of desks.

4) Centralized room for mainframe or restricted access computers (physically accessible to administrative offices, guidance, and library/media).

5) Joint venture school facilities designed for dual access and security.

6) School facilities designed with zones in mind for extended hour or weekend access. (Certain areas can be secured from general access. This would include areas for extended hours day care.)

7) Competitive enhancement of facilities for non-core curricular classrooms (industrial arts, music, vocational agriculture).

8) Available public transportation as a consideration in site selection.

9) Additional English as a Second Language classrooms.

10) Increase the current nurse/health area to include space for general dentistry/medicine.

11) Secure areas for extended care of students before and after school, including access to quiet "rest" areas, study areas, activity areas and rest rooms.

12) Rest areas for community volunteers.

13) Conference/planning areas for community volunteers.

14) "Time Out" rooms for emotionally impaired children.

15) Increased number of special education, resource, and remedial rooms.

Overarching Themes

Following the first round of responses, very mechanical themes began to emerge: technology, physical space, security, transportation, joint ownership, minority and underprivileged students. The second round, however, began to see a more abstract theme develop, that being the school as a social and community link. A link between generations (retired and school age); a link between the financially needy and the general health care that we as Americans have come to expect; a link between lack of resources at home and a plethora of community resources; a link between public and private; and a link between the community served and the rest of the world. As one participant stated, "One-stop social services as a point of entry for the family."

Reflections

It is clear that the Delphi process did all that its developers laid claim to: generation of ideas without face-to-face interaction, development of group consensus, and the management and analyzation of data. Furthermore, it is clear that qualitative research, architectural programming, and the Delphi technique are very complimentary. Unfortunately the stumbling blocks in this study were those placed there by the researcher.

One stumbling block involved a participant with an extremely strong knowledge of architecture and programming, but unfortunately an elementary and secondary education outside of the United States educational system. Being unfamiliar with the United States elementary and secondary school systems, he had a different schema from which to analyze and respond. The researcher must be cautious in the selection of participants, purposeful and not random selection must be done judiciously if the results are to be trustworthy.

The format of the questionnaire was lengthy, yet no comments were made as to it being overly time consuming; in fact, all participants considered it interesting. However, two participants gave verbal feedback regarding greater visual distinction between each section on prediction, probability, and time. These participants felt that each section should be "boxed" or "shaded" in order to visually separate it from the others. Furthermore, questions arose as to combining characteristics in later rounds. Should participants in the later rounds select only one characteristic as a favorite, should they select more than one, or should they re-write their responses completely in light of the other participants responses? To select only one results in a quick consensus of opinion, but little generation of ideas. To select more than one stagnates the process by not developing consensus and not generating new ideas. Re-writing new responses not only generates new ideas, but generates better and higher order ideas; unfortunately it is also the most time consuming for participants.

To complicate matters further, if participants are allowed to choose more than one response, shouldn't there be an available probability scale and time line for each response? To do this would increase the size of the survey instrument dramatically, and probably the participant dropout rate as well.

If the function of the pilot study is to determine methodological deficiencies, this pilot performed the task well. From the questioned areas, informed decisions were made and a better study emerged. The pilot study resulted in the addition of multiple probability scales and timelines for the fourth and fifth Delphi rounds of the research project. In addition, the decision was made to have participants re-write responses in rounds four and five, instead of choosing one favorite response.

One of the greatest misgivings of the researcher regarding the pilot study was lack of time for further Delphi rounds and analysis. Initial Delphi returns showed great promise, and further rounds with analysis could have resulted in higher order concepts which might have driven a new model of how we perceive the educational facility.

CHAPTER 6

Results

The focus of this study was designed to determine probable environmental futures which will impact education (Delphi rounds one and two), then develop themes and characteristics concerning how these environmental futures will impact the future of educational facilities (Delphi rounds three through five). In this chapter the survey return rates and instrument results from each of the five Delphi rounds are documented. When appropriate, descriptive statistics are used to define consensus towards a specific item and place it within a time frame.

Survey Return Rates

Survey return rates for the five rounds of the Delphi survey will be noted here and again with the results for each individual survey round. The survey was initiated with two reputationally similar sample groups of thirty individuals. One sample group of thirty was selected by reputational nomination to participate in rounds one and two of the survey instrument. From this group of thirty, twenty-four individuals agreed to participate in the study. Of the twenty-four individuals agreeing to participate in the study, twenty-two returned the the first round instrument (92 percent) and twenty returned the third round instrument (83 percent). On the second iteration, only those participants returning the first round survey instrument on time were mailed a second round survey. If the twenty-two participants returning the first round instrument are used as the based group for calculating return rates, the second round return rate would be 91 percent (twenty of twenty-two).

A second sample group of thirty reputationally nominated individuals were selected for participation in rounds three, four, and five of the survey. Of the thirty prospective participants from the population sample, twenty-two returned their requests with an affirmative response. Of the twenty two possible participants, fifteen completed round three of the survey (68 percent response rate), thirteen completed round four of the survey (59 percent), and twelve completed round five of the survey (55 percent). If the fifteen participants returning the third round instrument are used as the based group for calculating return rates, the fourth round return rate would be 87 percent (thirteen of fifteen) and the fifth round return rate would be 80 percent (twelve of fifteen).

Delphi Round One

A letter was mailed to all prospective participants in the first half of the study, explaining the study and requesting their participation (see Appendix D). Of the thirty prospective participants from the population sample, twenty-four returned their requests with an affirmative response, three returned their requests with a negative response, and three did not respond. Of the twenty-four positive responses, twenty participants completed round one of the survey and returned it by the deadline given, two participants completed round one of the survey but returned it after the deadline was given, and two participants did not return the survey. Total response rate for all participants was 73 percent (twenty-two of thirty possible), response rate for those twenty-four who initially agreed to participate was 92 percent (twenty-two of twenty-four possible). The responses of the two participants who returned their surveys belatedly were not included in the descriptive statistics utilized as feedback for round two of the study because the round two surveys had already been printed and mailed. The first round survey instrument is given in Appendix D.

Round one of the Delphi instrument consisted of twenty scenarios and forecasts extracted from the review of literature and from the 1989 through 1992 monthly abstracts of the Future Survey Annual. The twenty forecasts chosen for inclusion are noted below.

1. School districts will turn to private donations and foundations to supplement appropriations from local, state, and federal governments. These funds will not be meant to replace government funds, but to enhance them.

2. Public schools of the future will be called upon to educate not only students from the traditional ages of 5-17, but also older, even retired, adults. This expanded "adult education" role may include weekend or evening programs.

3. Future curriculum content will address the issue of diverse cultural values and languages. School personnel will utilize teaching strategies that stress appreciation, understanding, and the value of other cultures.

4. A greater proportion of tomorrow's students will enter school with one or more "strikes" against them. These "strikes" may include poverty or lower family income, a single parent household, or a minority heritage with parents of a below-average educational level.

5. Economic differences between double income families and single parent families will increase. One result of this economic inequality will be the development of technological haves and have nots in society.

6. School districts will become social service centers for their communities. Their services will include health and medical care, affordable day care, and job placement.

7. Economic rather than military strength will determine tomorrow's superpowers, and global leadership in science and technology will determine economic strength.

8. Information technology will blur the barrier between work, school and home, resulting in an indeterminate work/school day.

9. School districts will increasingly utilize business and industry trained professionals as classroom teachers.

10. The United States will continue to move from an industrial based economy to an information based economy where human intelligence, specialized data processing, and biological engineering are the key components.

11. Through computer technology and networking, small companies will be able to compete successfully with large firms. Networks or management teams will replace management hierarchies in most corporations.

12. Distance learning will be used extensively to bring quality, comprehensive learning experiences to all students.

13. The problems exhibited by children born to drug addicted mothers will cause educators to alter the approaches they utilize in educating children. New definitions for achievement may result and categories of special education may be expanded.

14. In the future, promotion between grade levels and graduation will be based upon the individual mastery of educational concepts and not by age. Students will be expected to exhibit mastery of pre-specified outcomes prior to promotion or graduation.

15. There will be a rise in the percentage of students enrolled in alternative schooling programs. These programs will include year-round classrooms, magnet schools in the arts and sciences, and the use of home schooling.

16. There will be a continued movement toward a globalization of economic markets, communications, and finance with an increased foreign ownership of U.S. industries and increased U.S. exports to foreign countries.

17. Computer technology will become an integral part in the diagnosis of student needs, the development of prescriptive instruction, and the monitoring of student progress.

18. Businesses will increasingly demand greater skills of high school graduates in problem solving, communications, and computer literacy.

19. Over half of all large companies (10,000+ workers) will offer some means of formal or informal education for their employees in the future.

20. There will be an increase in public attention to social and environmental issues.

Participants in round one of the survey were asked to read the twenty future scenarios and forecasts and then rate the forecasts individually as to probability of occurrence on a six-point Likert scale. The Likert scale ranged from highly probable to highly improbable. Participants were also asked to rate when the given forecast would receive widespread acceptance from never, today, or in five year intervals up to fifty years in the future.

In addition to the twenty initial forecasts, the survey participants were invited to add any additional scenarios and forecasts to the end of the survey which they felt were pertinent but omitted. The survey participants generated thirty further forecasts which as individuals they felt were appropriate for inclusion in the second round survey instrument. Each individual that added a forecast was asked to additionally rate their forecast as to probability and years to widespread acceptance. The thirty added forecasts were reduced to twenty-four by combining forecasts which were similar in nature. In those new forecasts which were not combined, the original words of the authors were used whenever possible. Changes were made only when the addition of a word or two helped to clarify or make a forecast more readable. The original words of the authors were used to preserve the uniqueness of each forecast. The twenty-four forecasts added by the survey participants are given below.

21. "Virtual reality" will become a tool for teaching, particularly geography, history, science, and someday math.
22. Inequities in funding of public schools will receive increasing levels of public attention resulting in court ordered restructuring of educational finances. This may include a shift from local to state (from private property tax formulas to sales or income tax formulas).
23. Students will be given vouchers to purchase their education from many sources, public or private.
24. A more efficient kind of internet will be developed that can be accessed and used easily from any site.
25. Just as the office at home is already a reality, the classroom at home will be a supplement to formal school classrooms. The media room at home will be the growth center for adults and children alike.
26. Volunteering, off-campus programs, learning in the community, helping others, tutoring, working/studying in social agencies and hospitals, et al. will dramatically increase in the coming years.
27. The relationship between learning, technology, and physical facilities will play a major role in restructuring education and the planning of new schools.
28. Traditional schedules, mandated report cards, required classes for all, segregated learning as in"at risk" attendance programs, and other indefensible trappings of schooling will be eliminated as part of the transformation to a new society and learning will truly be more individualized and personalized.

29. Schools will change their focus from beating the Japanese, high test scores and core curriculum, and begin to plan more appropriate and meaningful- but not segregated- programs for those who will work in restaurants and other non-technical, non-college jobs.

30. As a result of the increase in non-educational responsibilities on the part of the public schools (AIDS education, distribution of condoms, child care, etc.) private schools will increase in enrollment- up to one third of the national school age population.

31. IBM and Apple merge in an effort to open private schools where students are taught all subjects using CAI (Computer Assisted Instruction) methodology. These schools for profit will come into existence in the near future.

32. Schools will increasingly give major decision powers to stakeholders (parents, teachers, students), including giving much greater decision power to students to set goals and decide their program.

33. Change will come at the local level through the application of a processes approach (Total Quality Management is an example) that focuses on the customer's needs, results, and customer satisfaction. Applying sound methodology for change which focuses on attaining positive results for students will drive the education system.

34. Continually increasing use of powerful information technologies in formal schooling (as well as in more informal settings) will force the redefinition of the roles of building administrators, teachers, and learners.

35. Teachers will double or triple the number of students they can manage at one time with expert systems and coordinated use of personal computer based tutoring programs.

36. Schooling cannot continue to exist, but must transition to education and finally to learning in a transformed society where there will be no 9:00-3:00, K-12 schools as exist in 1992.

37. New elementary schools will be planned and designed as community schools. Existing schools will be expanded to include the community school concept where social agencies are physically located in the school and work closely with school personnel.

38. Community learning centers (or learning access centers), created around a multi-media technology center, will be open year-round and around-the-clock to serve learners of all ages. These centers would also be available to tourists on vacation.

39. Teacher role, function preparation, radical change in new roles include tutor, day care expert, consulting expert, coach developmental psychologist, planner, arranger, etc.

40. Fiber optic networks will link homes throughout the U.S. to business, educational institutions and services, banks, etc.

41. We will have learning credit accounts used to pay for any educational/learning certified program or activity.

42. Learning (computer based) becomes a national (and global) network-based process. Cross boundary fertilization of education and educational ideas, i.e. U.S.-Japan interchange.

43. Traditional requirements will give way to really important, crucial studies, such as the 64 global dilemmas, which are really one, one-macroproblem- how to become the way to a preferable future for humankind.

44. The professional schools will continue to develop their students into "team" group cohesive decision makers.

The researcher collected and tabulated responses from the survey instrument and developed descriptive statistics (group mean and frequency distribution) that were used as feedback for the second round of the survey. Probability means were determined by giving participant responses a numerical value (for example giving a highly probable rating a +3, a probable rating a +2, a somewhat probable rating a +1, a somewhat improbable rating a -1, a improbable rating a -2, and a highly improbable rating a -3). Responses were totalled and divided by the number of respondents.

Means for years to widespread use were developed by adding the responses of the participants (today, 5, 10, 15 years . . .never) and dividing by the total number of respondents. Responses marked "today" were given a numerical value of zero and were included in the total number of respondents. Responses marked "never" were given a value of zero, but were not included in the total number of respondents. The first round survey instrument is given in Appendix D. The first round survey responses (mean and frequency distributions) are documented in the second round survey instrument (Appendix E). The means for probability and years to widespread use generated in rounds one and two of the survey instrument are noted for comparison in Table 6.1.

Table 6.1

Descriptive Statistics for Rounds One and Two
of the Survey Instrument

Forecast Number	Round #1 Probability	Round #1 Timeline	Round #2 Probability	Round #2 Timeline
#1	1.90	5.55	2.35	5.50
#2	2.30	6.30	2.35	5.26
#3	2.56	6.67	2.90	5.00
#4	2.58	3.33	2.95	1.25
#5	2.32	4.73	2.55	4.00
#6	1.89	9.41	1.80	8.42
#7	2.55	5.00	2.70	4.25
#8	2.22	5.55	2.75	7.50
#9	1.75	7.50	1.90	6.75
#10	2.42	10.00	2.55	8.25
#11	1.85	10.25	2.25	8.25
#12	2.50	7.75	2.65	7.50
#13	1.95	6.57	2.10	6.11
#14	1.84	10.00	2.15	8.75
#15	2.12	7.50	2.60	4.75
#16	2.62	7.50	2.80	4.50
#17	2.60	8.50	2.95	6.75
#18	2.65	6.00	2.95	3.00
#19	2.61	7.77	3.00	5.00
#20	2.70	4.75	2.95	3.25

Table 6.1, continued

Forecast Number	Round #1 Probability	Round #1 Timeline	Round #2 Probability	Round #2 Timeline
#21	3.00	12.50	2.35	10.75
#22	2.30	6.30	2.35	6.75
#23	2.56	6.67	0.55	6.05
#24	3.00	5.00	2.65	8.00
#25	2.00	15.00	2.10	11.75
#26	3.00	10.00	2.15	8.50
#27	2.50	10.00	2.20	9.25
#28	2.00	15.00	1.70	13.50
#29	2.00	10.00	1.20	11.75
#30	2.00	10.00	0.58	10.88
#31	1.00	10.00	0.65	11.39
#32	2.00	5.00	1.74	8.94
#33	3.00	10.00	1.35	9.47
#34	2.00	15.00	2.45	8.50
#35	2.00	10.00	1.20	12.89
#36	2.00	30.00	0.11	22.50
#37	3.00	0.00	2.40	7.25
#38	2.00	10.00	1.75	12.25
#39	2.00	25.00	1.61	15.56
#40	3.00	5.00	2.65	10.50
#41	1.00	20.00	0.00	20.59
#42	2.00	30.00	2.10	15.00

Table 6.1, continued

Forecast Number	Round #1 Probability	Round #1 Timeline	Round #2 Probability	Round #2 Timeline
#42	2.00	30.00	2.10	15.00
#43	2.00	15.00	-0.06	19.38
#44	2.00	5.00	1.65	10.29
#45	N/A	N/A	-2.00	30.00

Delphi Round Two

Twenty participants returned the first round survey instruments on time. Of these twenty, all twenty returned the second round survey instrument by the deadline. Total response rate from first round to second round was 100 percent; attrition rate was 0 percent.

Thirty new forecasts were generated by the participants in round one of the survey. From these thirty new forecasts, six were combined with responses from other participants on the basis that their content were very similar. The remaining twenty-four new forecasts were added to the original twenty from the first round survey to make up the second round survey instrument. The second round survey instrument included quantitative feedback in the form of mean number of years to widespread acceptance and frequency distribution of both the Likert scale responses and timeline. The second round survey instrument is given in Appendix E.

After reading the feedback from round one, participants were asked to reread the future forecasts and then rerate them as to probability of occurrence and time to widespread acceptance. In addition, the group of participants were asked to rate the new forecasts given by individual participants of the first round. Finally, the participants were again asked to contribute any new forecasts which they felt were pertinent to the study. Only one new forecast was given in round two of the survey. The survey results (mean and frequency distributions) to round one and round two of the Delphi are documented for comparison in Appendix F.

The researcher re-tabulated responses to the second round, again developing statistical measures of mean and frequency distribution. The descriptive statistics generated by rounds one and two of the survey instrument are noted in Table 6.1. In Table 6.2 each of the forty-five forecasts from round two of the survey instrument are listed in rank order by their rated probability of occurrence with rank order #1 (Probability +3.00) being the most likely to occur and rank order #45 (Probability -2.00) being the least likely to occur.

Table 6.2

Rank Order of Forecasts by Probability of Occurrence
Round Two

Rank Order	Forecast Number	Round #1 Probability	Round #1 Timeline	Round #2 Probability	Round #2 Timeline
# 1	#19	2.61	7.77	3.00	5.00
# 2	#4	2.58	3.33	2.95	1.25
# 2	#17	2.60	8.00	2.95	6.75
# 2	#18	2.65	6.00	2.95	3.00
# 2	#20	2.70	4.75	2.95	3.25
# 6	#3	2.56	6.67	2.90	5.00
# 7	#16	2.62	7.50	2.80	4.50
#8	#8	2.22	5.55	2.75	7.50

Table 6.2, continued

Rank Order	Forecast Number	Round #1 Probability	Round #1 Timeline	Round #2 Probability	Round #2 Timeline
#9	#7	2.55	5.00	2.70	4.25
#10	#12	2.50	7.75	2.65	7.50
#10	#24	3.00	5.00	2.65	8.00
#10	#40	3.00	5.00	2.65	10.50
#13	#15	2.12	7.50	2.60	4.75
#14	#5	2.32	4.73	2.55	4.00
#14	#10	2.42	10.00	2.55	8.25
#16	#34	2.00	15.00	2.45	8.50
#17	#37	3.00	0.00	2.40	7.25
#18	#1	1.90	5.55	2.35	5.50
#18	#2	2.30	6.30	2.35	5.26
#18	#21	3.00	12.50	2.35	10.75
#18	#22	2.30	6.30	2.35	6.75
#22	#11	1.85	10.25	2.25	8.25
#23	#27	2.50	10.00	2.20	9.25
#24	#14	1.84	10.00	2.15	8.75
#24	#26	3.00	10.00	2.15	8.50
#26	#13	1.95	6.57	2.10	6.11
#26	#25	2.00	15.00	2.10	11.75
#26	#42	2.00	30.00	2.10	15.00
#29	#9	1.75	7.50	1.90	6.75

Table 6.2, continued

Rank Order	Forecast Number	Round #1 Probability	Round #1 Timeline	Round #2 Probability	Round #2 Timeline
#30	#6	1.89	9.41	1.80	8.42
#31	#38	2.00	10.00	1.75	12.25
#32	#32	2.00	5.00	1.74	8.94
#33	#28	2.00	15.00	1.70	13.50
#34	#44	2.00	5.00	1.65	10.29
#35	#39	2.00	25.00	1.61	15.56
#36	#33	3.00	10.00	1.35	9.47
#37	#29	2.00	10.00	1.20	11.75
#37	#35	2.00	10.00	1.20	12.89
#39	#31	1.00	10.00	0.65	11.39
#40	#30	2.00	10.00	0.58	10.88
#41	#23	2.56	6.67	0.55	6.05
#42	#36	2.00	30.00	0.11	22.50
#43	#41	1.00	20.00	0.00	20.59
#44	#43	2.00	15.00	-0.06	19.38
#45	#45	N/A	N/A	-2.00	30.00

After round two, any forecasts with mean probabilities of occurrence falling in the range below probable (+2.00) to highly improbable (-3.00) were dropped from consideration for round three of the survey instrument. Of the forty-five eligible forecasts, twenty-eight were accepted for use in the third round of the survey and seventeen were dropped from the survey. Listed below are the twenty-eight forecasts accepted for use in the third round of the survey instrument. They are listed in order of their probability with the first forecast being the most probable and maintain their original forecast number.

19. Over half of all large companies (10,000+ workers) will offer some means of formal or informal education for their employees in the future.

4. A greater proportion of tomorrow's students will enter school with one or more "strikes" against them. These "strikes" may include poverty or lower family income, a single parent household, or a minority heritage with parents of a below-average educational level.

17. Computer technology will become an integral part in the diagnosis of student needs, the development of prescriptive instruction, and the monitoring of student progress.

18. Businesses will increasingly demand greater skills of high school graduates in problem solving, communications, and computer literacy.

20. There will be an increase in public attention to social and environmental issues.

3. Future curriculum content will address the issue of diverse cultural values and languages. School personnel will utilize teaching strategies that stress appreciation, understanding, and the value of other cultures.

16. There will be a continued movement toward a globalization of economic markets, communications, and finance with an increased foreign ownership of U.S. industries and increased U.S. exports to foreign countries.

8. Information technology will blur the barrier between work, school, and home, resulting in an indeterminate work/school day.

7. Economic rather than military strength will determine tomorrow's superpowers, and global leadership in science and technology will determine economic strength.

12. Distance learning will be used extensively to bring quality, comprehensive learning experiences to all students.

24. A more efficient kind of internet will be developed that can be accessed and used easily from any site.

40. Fiber optic networks will link homes throughout the U.S. to business, educational institutions and services, banks, etc.

15. There will be a rise in the percentage of students enrolled in alternative schooling programs. These programs will include year-round classrooms, magnet schools in the arts and sciences, and the use of home schooling.

5. Economic differences between double income families and single parent families will increase. One result of this economic inequality will be the development of technological haves and have nots in society.

10. The United States will continue to move from an industrial based economy to an information based economy where human intelligence, specialized data processing, and biological engineering are the key components.

34. Continually increasing use of powerful information technologies in formal schooling (as well as in more informal settings) will force the redefinition of the roles of building administrators, teachers, and learners.

37. New elementary schools will be planned and designed as community schools. Existing schools will be expanded to include the community school concept where social agencies are physically located in the school and work closely with school personnel.

1. School districts will turn to private donations and foundations to supplement appropriations from local, state, and federal governments. These funds will not be meant to replace government funds, but to enhance them.

2. Public schools of the future will be called upon to educate not only students from the traditional ages of 5-17, but also older, even retired, adults. This expanded "adult education" role may include weekend or evening programs.

21. "Virtual reality" will become a tool for teaching, particularly geography, history, science, and someday math.

22. Inequities in funding of public schools will receive increasing levels of public attention resulting in court ordered restructuring of educational finances. This may include a shift from local to state (from private property tax formulas to sales or income tax formulas).

11. Through computer technology and networking, small companies will be able to compete successfully with large firms. Networks or management teams will replace management hierarchies in most corporations.

27. The relationship between learning, technology, and physical facilities will play a major role in restructuring education and the planning of new schools.

14. In the future, promotion between grade levels and graduation will be based upon the individual mastery of educational concepts and not by age. Students will be expected to exhibit mastery of pre-specified outcomes prior to promotion or graduation.

26. Volunteering, off-campus programs, learning in the community, helping others, tutoring, working/studying in social agencies and hospitals, et al. will dramatically increase in the coming years.

13. The problems exhibited by children born to drug addicted mothers will cause educators to alter the approaches they utilize in educating children. New definitions for achievement may result and categories of special education may be expanded.

25. Just as the office at home is already a reality, the classroom at home will be a supplement to formal school classrooms. The media room at home will be the growth center for adults and children alike.

42. Learning (computer based) becomes a national (and global) network-based process. Cross boundary fertilization of education and educational ideas, i.e. U.S.-Japan interchange.

The following two forecasts were utilized as initial forecasts in the first round of the survey but did not receive high enough probability means to justify their inclusion in round three of the survey instrument. They are listed in order of their probability and maintain their original forecast number.

9. School districts will increasingly utilize business and industry trained professionals as classroom teachers.

6. School districts will become social service centers for their communities. Their services will include health and medical care, affordable day care, and job placement.

The following fifteen forecasts were developed by the survey participants in rounds one and two of the survey, but did not receive high enough probability means to justify their inclusion in round three of the survey instrument. They are listed in order of their probability and maintain their original forecast number.

38. Community learning centers (or learning access centers), created around a multi-media technology center, will be open year-round and around-the-clock to serve learners of all ages. These centers would also be available to tourists on vacation.

32. Schools will increasingly give major decision powers to stakeholders (parents, teachers, students), including giving much greater decision power to students to set goals and decide their program.

28. Traditional schedules, mandated report cards, required classes for all, segregated learning as in"at risk" attendance programs, and other indefensible trappings of schooling will be eliminated as part of the transformation to a new society and learning will truly be more individualized and personalized.

44. The professional schools will continue to develop their students into "team" group cohesive decision makers.

39. Teacher role, function preparation, radical change in new roles include tutor, day care expert, consulting expert, coach developmental psychologist, planner, arranger, etc.

33. Change will come at the local level through the application of a processes approach (TQM is an example) that focuses on the customer's needs, results, and customer satisfaction. Applying sound methodology for change which focuses on attaining positive results for students will drive the education system.

29. Schools will change their focus from beating the Japanese, high test scores, and core curriculum, and begin to plan more appropriate and meaningful- but not segregated- programs for those who will work in restaurants and other non-technical, non-college jobs.

35. Teachers will double or triple the number of students they can manage at one time with expert systems and coordinated use of PC-based tutoring programs.

31. IBM and Apple merge in an effort to open private schools where students are taught all subjects using CAI (Computer Assisted Instruction) methodology. These schools for profit will come into existence in the near future.

30. As a result of the increase in non-educational responsibilities on the part of the public schools (AIDS education, distribution of condoms, child care, etc.), private schools will increase in enrollment- up to one third of the national school age population.

23. Students will be given vouchers to purchase their education from many sources, public or private.

36. Schooling cannot continue to exist, but must transition to education and finally to learning in a transformed society where there will be no 9:00-3:00, K-12 schools as exist in 1992.

41. We will have learning credit accounts used to pay for any educational/learning certified program or activity.

43. Traditional requirements will give way to really important, crucial studies, such as the 64 global dilemmas, which are really one, one-macroproblem- how to become the way to a preferable future for humankind.

45. Given the failure of the schools to respond to the call for change in the 30's and 60's, there is little hope for significant change in the 90's. Therefore in 2020, except for some technology additions, schools will be structured much as they were to start 1990.

Rounds one and two of the Delphi survey instrument were designed to accomplish three objectives: to validate the original forecasts as probable or improbable, to generate further forecasts based upon the participant's expertize or brainstorming, and to develop consensus as to a a common body of probable environmental futures from which the participants in later rounds could forecast educational specifications.

Delphi Round Three

In the third round of the Delphi survey, the second sample of futurists began the second portion of the study designed to generate initial forecasts of educational specifications based upon the probable environmental futures (forecasts) of rounds one and two. A letter was mailed to all prospective participants explaining the study and requesting their participation (see Appendix G). Of the thirty prospective participants from the population sample, twenty-two returned their requests with an affirmative response, two returned their requests with a negative response, three did not respond, and one affirmative response arrived four months late (misplaced by the U.S. Postal Service during the midwest Missouri flooding of July 1993). Two letters were returned due to address changes where no forwarding address was available. Of the twenty-two possible participants, fifteen completed round three of the survey and returned it by the deadline given (68 percent response rate).

In round three of the Delphi survey, the new sample members received qualitative information from the results of round two (in the form of the twenty-eight most probable scenarios and forecasts). In addition, each participant received a definition and description of educational specifications. From this information, participants were asked to respond to one question: "Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?" Participants were asked to write a brief description of the characteristics for each of the twenty-eight forecasts. In addition, participants were allowed to add additional scenarios and forecasts to the survey which they felt were pertinent but omitted. These new forecasts were compiled and included in round four of the survey instrument. The round three survey instrument is given in Appendix G. The round three survey responses are documented in the round four survey instrument (see Appendix H).

The researcher collected the results of the third round, compiling a summary of participant responses (educational specifications), which were then used as qualitative feedback for participants in round four. Due to the uniqueness of many of the responses, none of the responses was condensed and all responses were provided as feedback to the participants in the fourth round. No attempt was made to provide quantitative feedback to the participants in the fourth round, such as frequency of responses related to a certain idea or characteristic. This decision was based upon the belief that purely qualitative feedback would provide the impetus for the brainstorming of new ideas, while quantitative feedback at this point would prematurely result in the forced consensus of ideas as participants began to compare their ideas to the statistical group norm.

Through qualitative data analysis, the researcher began to develop emergent themes that would be compared to round four themes and ultimately be used as a basis for the round five survey instrument. The methods of qualitative data analysis used included coding of response data (facilitated by a computer relational database) and the development of themes through the use of "clustering" and matrix techniques. These methods resulted in the emergence of two overall or "umbrella" themes and seventeen sub themes. These themes are noted for comparison by constant/comparative methods to round four themes. The following overall themes are the result of qualitative analysis of the round three survey results.

Overall themes:

1. The school as a community center. In addition to the traditional educational offerings, a variety of social service, cultural, and recreational programs will be offered to the community at the local school site.

2. Technology as the educational link between homes, schools, businesses, and other communities. Advancements in technology will expand the educational offerings available to the community. Computer, phone, fax, and interactive television may link the school with homes, schools, businesses and other communities.

Sub themes:

1. Adult and continuing education. The school will offer a variety of adult and continuing education to the patrons of the community after hours or on weekends.

2. A variety of instructional methods and learning styles. Changes in educational philosophy from the teacher being predominantly a lecturer to the teacher being a facilitator will change how classrooms operate on a daily basis.

3. Year round operation and extended daily hours. The school facility will be open to the public for extended hours of access including before school, after school, and during the summers.

4. Child care/day care. The school will provide quality child and day care for working mothers and fathers. This may require extended hours and facilities.

5. Community medical and social services available at school. The school will begin to offer minor medical and social service programs at the school. This will require specialized spaces and rooms.

6. The multi-locational educational facility. School children, particularly high school age, may receive a variety of educational experiences at local businesses, cultural and civic centers. In addition, they may access the school from these sites and their homes via technology links.

7. The self contained telemodular unit (SC-TMU) for home. School facility use may be minimized in the future by the use of standardized, 10' by 10' interactive, self contained telemodular units with virtual reality telecommunication capabilities. These units will be mobile and permit access to electronic information and educational collaboration across the globe.

8. The use of computer technology in curriculum and assessment. The use of classroom and portable computers is expected to increase dramatically. This will effect work areas and electrical services.

9. The use of interactive video technology in curriculum and assessment. Interactive television will link classrooms and teachers across the nation. This will enhance curricular offerings particularly in small rural schools.

10. Continued emphasis on mathematics and sciences. Schools should be designed with flexible lab and classroom spaces for math and science.

11. Teacher planning and preparation. With changing teacher roles, the classroom teacher will have a greater need for collaboration with their peers and with planning/work spaces.

12. Flexibility/internal environment. Buildings must be designed with flexibility and adaptability in mind. This includes the capability to add future (and as yet unknown) technology to classroom spaces.

13. Ecology/external environment. Schools should be designed with a concern for the environment, utilizing advancements in environmentally friendly construction and operating practices. In addition, there should be areas for students to interact with nature in an environmental responsible nature.

14. The educational facility as a community cultural and social center. The school facility will be perceived as not only an educational institution but also as a community social and cultural center.

15. Financing educational facilities. Expanded programmatic offerings (social services, medical services, etc.) may bring an expanded financial base from which to construct school facilities.

16. Special needs students. The movement towards placing special needs students in the traditional classroom setting may require expanded classroom spaces or the assistance of additional staff.

17. Food service. Food services and eating areas will become more humane and less institutionalized.

Delphi Round Four

In round four, the fifteen participants from round three received the initial forecasts and qualitative summaries of responses to the third round and were asked to respond to the question: "Having read the first round responses to this forecast, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?" The term "first round responses" referred to the responses to the first round of the second section of the study (Architectural Programming for Educational Futures), which overall was the third round of the Delphi survey.

Of the fifteen participants that returned the third round survey, thirteen returned the fourth round survey instrument by the given deadline. Total response rate from the third to fourth round was 87 percent; attrition rate was 13 percent. The fourth round survey responses are documented in Appendix I.

The researcher collected the results of the fourth round, compiling a summary of participant responses (educational specifications), which through qualitative data analysis (coding of response data, clustering and matrix techniques) led to a series of emergent themes. Analysis of the round three and round four themes through constant/comparative methods resulted in a set of higher level themes that were then used as a basis for the round five survey instrument.

Round four of the instrument, because it permitted participants to view the responses of others, had two objectives. The round four instrument generated new responses of higher intellectual order (brainstorming), and it also began initial but not forced development of group consensus, as participants rejected ideas of limited value and retained in their answers those they consider worthy. The following twelve themes are the result of qualitative analysis of the round four survey results. In addition, they serve as the organizing themes for the fifth round survey instrument. These twelve themes are supported by a series of correlating architectural considerations. These themes and supporting architectural considerations are detailed in Appendix J and in the fifth round survey results.

1. The community use of facilities. The mission of the school will expand from educating the traditional bracket age group (5-18) to educating a community of life-long learners. The local school will offer educational, cultural, and recreational programs to meet the needs of pre-school through geriatric age students.

2. Extended hours/year round access. The traditional school day and year is being challenged in many communities. In addition, some schools have chosen a year-round rotating schedule for students, thereby increasing

building capacity by as much as 20 to 25 percent. An extended day or year round facility has several unique programming characteristics.

3. The school as a pre-school and before- and after-school care center. The number of single parent households and households in which both parents work are increasing dramatically. Teenage pregnancy is on the rise. The need for affordable, developmentally appropriate pre-school or child care programs is evident. Unfortunately, child care programs that are of high quality are also expensive or limited. Research has shown that developmentally appropriate pre-school educational programs are cost effective because they reduce grade failure and dropout rates. Future school offerings will include pre-school programs and before- and after-school care.

4. Service agencies/prevention services for at-risk children. Schools and service agencies have begun to recognize the importance of coordinating their efforts to assist at-risk children. Early intervention and prevention programs representing a variety of agencies will be housed at the local school, thereby providing a comprehensive and concerted effort to meet the physical, intellectual, emotional, and social needs of all students.

5. Cultural diversity and school facilities. The U.S. population increasingly reflects minority groups. Within a decade, one in every three students will come from a minority background. At some point in the future, the "majority" population will consist of groups of "minorities." Future curriculum content will address the issue of diverse cultural values and languages. Multidisciplinary teams will facilitate study of ethnic art, architecture, food, history, government, and literature as well as language.

6. Flexibility in school facilities. The schoolhouse can no longer be thought of as a group of rigid spaces that do not change. Instead schools are places where activities change daily and therefore space and equipment must change also. In addition, most school structures are built for a lengthy lifespan whereas technology and society are changing at a rapid rate. Future facilities must be capable of adapting to these changes.

7. Electronic media in curriculum, instruction, and assessment. Classrooms of the future will be equipped with a variety of technological equipment in very flexible classroom arrangements so that learning groups can be involved as individuals or pairs at times, can move into small group activities of many types, can communicate with a resource center in the school or to anyplace in the world. The emphasis will be on using technology as a learning tool, rather than technology as a subject matter.

8. A variety of instructional methods and strategies. We would expect our medical doctors to treat their patients with the latest techniques and prescriptions known to modern medicine. In turn educators should be expected to use the most modern and research proven instructional strategies with their students. The lecture method of teaching, which has been a mainstay of education for centuries, is being supplemented by more recent

knowledge in individualized and group instruction, learning styles of students, team teaching, and cooperative learning.

9. Teacher planning and professional development. Schools are responding to a need to graduate students who have demonstrated through outcomes assessments that they can produce. To facilitate this teachers will have to become more knowledgeable about research in effective teaching strategies and then work with other teachers in defining appropriate instructional methods and outcome assessments. In essence the role of the teacher will become that of facilitator.

10. Financing future facilities. The financing of future educational facilities may not have a large impact on the educational specifications. However, it may effect the size of the facility and the quality of construction.

11. Special education. The movement in special education is towards the inclusion of special needs students in the regular classroom. These students may have larger space requirements than the regular student and could require the assistance of additional staff.

12. The multi-location multi-media educational experience. In the future it is likely that a stronger link will exist between the resources of the school, community, and industry. Students may have physical or electronic access to community resources such as libraries, museums, concert halls, colleges, government centers, retail establishments, health centers, and research and production facilities. In turn, when industry needs people with new skills the school will respond with re-training programs or facility access.

Delphi Round Five

In round five of the Delphi, the study participants did not receive the initial forecasts given in rounds three and four, but instead received a series of twelve themes that had emerged from the data. Underneath each of the twelve themes was a set of programming considerations that emerged from the data analysis and that supported that particular theme. Participants were asked to rate each set of considerations (organized by the twelve themes) on a six-point Likert scale, ranging from no probability to high probability of occurrence. In addition, participants were asked to rate when each set of considerations would become widely accepted. The Likert scale and timeline were designed to validate the considerations and themes as well as generate group consensus. Participants were encouraged to write any additional comments that they had at the end of the survey. The twelve themes and supporting architectural considerations are documented in Appendix J, the fifth round survey instrument.

Thirteen participants returned the fourth round survey instrument on time. Of these thirteen, twelve returned the fifth round survey instrument by the deadline. Total response rate from the third to the fifth round was 80 percent; attrition rate was 20 percent.

The researcher collected and tabulated responses from the fifth round survey instrument and developed descriptive statistics (group mean and frequency distribution) that were used to determine consensus. Probability means were determined by giving participant responses a numerical value (for example giving a highly probable rating a +3, a probable rating a +2, a somewhat probable rating a +1, a somewhat improbable rating a -1, a improbable rating a -2, and a highly improbable rating a -3). Responses were totalled and divided by the number of respondents.

Means for years to widespread use were developed by adding the responses of the participants (today, 5, 10, 15 years . . .never) and dividing by the total number of respondents. Responses marked "today" were given a numerical value of zero, and were included in the total number of respondents. Responses marked "never" were given a value of zero, but were not included in the total number of respondents. The fifth round survey responses (mean and frequency distributions) are documented in Appendix K. The means for probability and years to widespread use generated in round five of the survey instrument are detailed in Table 6.3. It should be noted that eight of the twelve themes were rated by the sample group as being probable (+2.00) to highly probable (+3.00) and the other four themes received mean ratings of somewhat probable to probable (+1.00 to +2.00). None of the themes received mean ratings of somewhat probable to highly improbable (1.00 to -3.00).

Table 6.3

Descriptive Statistics for Round Five of the Survey Instrument

Theme Number	Round #5 Probability	Round #5 Timeline
#1	2.25	10.00
#2	2.08	13.18
#3	1.58	10.00
#4	1.42	16.82
#5	2.00	12.92
#6	2.25	11.25
#7	2.50	12.27
#8	2.50	11.67
#9	2.25	12.50
#10	1.92	8.33
#11	2.25	8.64
#12	1.83	15.83

In Table 6.4 each of the themes are listed in rank order by their rated probability of occurrence with rank order #1 (Probability +2.50) being the most likely to occur and rank order #12 (Probability +1.42) being the least likely to occur. It is noted that theme numbers seven and eight received identical probability ratings of 2.50 and theme numbers one, six, nine, and eleven received identical probability ratings of 2.25.

Table 6.4

Rank Order of Thematic Characteristics
by Probability of Occurrence
Round Five

Rank Order	Theme Number	Round #5 Probability	Round #5 Timeline
#1	#7	2.50	12.27
#1	#8	2.50	11.67
#3	#1	2.25	10.00
#3	#6	2.25	11.25
#3	#9	2.25	12.50
#3	#11	2.25	8.64
#7	#2	2.08	13.18
#8	#5	2.00	12.92
#9	#10	1.92	8.33
#10	#12	1.83	15.83
#11	#3	1.58	10.00
#12	#4	1.42	16.82

The following twelve themes and supporting architectural considerations are listed in their entirety. They are rank ordered by their probability of occurrence starting with the most probable and ranging to the least probable. Themes with identical probability means (ties) are noted by identical theme numbers (ties). The original theme numbers are noted in parentheses at the end of each theme.

1. Electronic media in curriculum, instruction, and assessment. Classrooms of the future will be equipped with a variety of technological equipment in very flexible classroom arrangements so that learning groups can be involved as individuals or pairs at times, can move into small group activities of many types, can communicate with a resource center in the school or to anyplace in the world. The emphasis will be on using technology as a learning tool, rather than technology as a subject matter. (7).

   Programming Considerations:

   Schools should incorporate a variety of technologies, not just one specific technology as in "fiber optics." The challenge will be to design facilities for the delivery of the educational program, of which technology may be one of the mediums to enhance the process.

   For the near future schools should be planned with an interactive television "distance learning" room. All classrooms should be "wired" for this technology (electricity and fiber optics or cellular), thereby providing capability of moving equipment to various areas or someday expanding distance learning use to several classroom areas. Movable, large and thin, liquid crystal display (LCD) panels may one day replace televisions as the medium for viewing video transmissions.

   At present, interactive television requires specially designed lighting and acoustics unique to the technology. This includes sound absorbing walls, controlled artificial lighting, specialized equipment for audio and video transmission/reception.

   Interactive television may have implications for community use. Future society will require that community members be "life-long learners." Community members may desire continued education to keep abreast of changes in society, businesses may expect new knowledge or skills of their workers, and retired community members may desire further education just for fun. In each of these scenarios, interactive television can link businesses and communities to neighboring communities, business professional development programs, or even local and national institutions of higher education. The result would be a live, interactive network for adult and continuing community education. Implications for facilities are interactive "distance learning" classroom with community access.

   Virtual reality is quickly becoming more defined as a technology. Since its capability has not been fully defined, the best hedge for its school use is to provide conduits and connections to permit the addition of specialized wiring in the future.

   Computers may play a minor role in the diagnosis and prescription of student learning; however, they will play a major role in the access to information. This access may be stationary as in a fixed media lab, it may be portable as in network connections for portable computers at all student workstations, or the access may be off site where students or community members can access the school's network or any other network via their home or work computer. The available information is at present predominantly non-interactive audio, video and data, but may soon include full interactive capability.

The traditional stand-alone computer lab will be replaced by networked computers which will be integrated throughout the building. The implication is increased network cabling and electrical capacity. At present the increased electrical capacity may be in amperage and outlets, but increased efficiency of computer design may reduce the requirements for amperage in the circuits. Classroom sizes may be larger or smaller based upon advancements in computer hardware design.

Advancements in lap-top, notebook, and notepad computers may make it possible in the future to issue portable computers to students on a loan and use basis to be taken from class to class. This suggests electrical and networking connections and more hands on space at all locations.

Electronic media has the potential to link classrooms across the state, nation, or even the world. However, the geometric advancements in technology make it imperative for schools to consider adaptability, flexibility, suitability, adequacy, and efficiency when discussing the use of technology in the classroom.

1. A variety of instructional methods and strategies. We would expect our medical doctors to treat their patients with the latest techniques and prescriptions known to modern medicine. In turn educators should be expected to use the most modern and research proven instructional strategies with their students. The lecture method of teaching, which has been a mainstay of education for centuries, is being supplemented by more recent knowledge in individualized and group instruction, learning styles of students, team teaching, and cooperative learning. (8).

Programming Considerations:

The role of the teacher will be predominantly that of facilitator. As a facilitator, teachers must have ready access to planning or preparation areas, access to a variety of technology in their office and instructional areas, and access to support space for conferencing, volunteers, and storage.

Interdisciplinary team teaching would be facilitated by common support/ planning areas and common planning times during the day.

A variety of instructional groupings must be facilitated including individualized, cooperative teams or groups, whole class and interactive distance learning. If instruction is truly individualized, multidisciplinary and multi-age grouping may occur. This implies individual study spaces, small group areas, seminar spaces, and large open areas all of which may be reconfigured or modified as needed. In addition, individual and small group storage space will be required.

As instructional environments and instructional methods vary with need, it is important that adequacy, access to and location of technology be considered. Regardless of the configuration, students and teachers must have access to technology (electrical access, interactive video, network data or some as yet undiscovered technology). In addition, the ability to upgrade or add new technology to the instructional environment should be considered.

The flexibility of instructional grouping must be matched by equal flexibility and adequacy of electrical and computer/interactive television network connections. These connections must be numerous enough and well placed so as to permit walls and furniture to be moved as needed.

Artificial lighting, climate control and sound absorbing wall, ceiling and floor materials will be desirable in all classrooms, particularly those involving computers and interactive television technology.

3. The community use of facilities. The mission of the school will expand from educating the traditional bracket age group (5-18) to educating a community of life-long learners. The local school will offer educational, cultural and recreational programs to meet the needs of pre-school through geriatric age students. (1).

Programming Considerations:

School facilities may be open for an extended length of time, which may include around-the-clock or year-round use. The internal and external facility may be designed to be "zoned," thereby restricting access to certain areas at certain times of the day.

The school plays an important function in meeting the socialization needs of the community. As such, access to meeting rooms, recreational facilities, libraries, food service facilities, and specialized labs is important.

As a community center the school site should have pedestrian access and links to parks, good auto access and parking, and sufficient night lighting.

As a community center, the school may cooperate with outside agencies and centers to cooperatively house their programs under one roof. The implications are larger facility size, specialized spaces in addition to classrooms, and broadened financial capability.

Areas of the facility with multiple uses (particularly those used by outside groups) will require increased and possibly specialized storage areas.

The facilities should be designed with materials that are durable and easily maintained. Constant use requires constant cleaning.

3. Flexibility in school facilities. The schoolhouse can no longer be thought of as a group of rigid spaces that do not change. Instead schools are places where activities change daily and therefore space and equipment must change also. In addition, most school structures are built for a lengthy lifespan whereas technology and society are changing at a rapid rate. Future facilities must be capable of adapting to these changes. (6).

   Programming Considerations:

   An increasingly changing society makes it difficult to forecast future needs. Therefore facilities should be designed around the principles of flexibility and adaptability.

   Facilities should be planned for the maximum use of technologies not just one technology. Designers must plan for ever changing (and yet unforeseen) technologies.

   Areas with radical fluctuations in enrollment may consider the use of modular classroom facilities which can be added or removed based upon need (these should not be confused with converted mobile homes).

   A need may exist for office space for scheduling and organizing relevant educational experiences correlated with the resources of the community (libraries, museums, concert halls, research facilities, health centers, research and production facilities.

   The notion of "standard" sized classrooms placed on both sides of a long hallway in the traditional "egg carton" fashion will give way to a variety of classroom shapes, sizes, and furnishings. This variety will be enhanced by movable walls and utilities to facilitate changing group structures for learning.

3. Teacher planning and professional development. Schools are responding to a need to graduate students who have demonstrated through outcomes assessments that they can produce. To facilitate this teachers will have to become more knowledgeable about research in effective teaching strategies and then work with other teachers in defining appropriate instructional methods and outcome assessments. In essence the role of the teacher will become that of facilitator. (9).

   Programming Considerations:

   Teachers will need improved office areas with electronic media access where they will be able to personally review research, study, and plan.

   Teachers will need areas where small groups of teachers and entire faculties can meet cooperatively to learn and plan programs. This cooperative planning may be interdisciplinary at times, other times departmentalized.

Through interactive television links to colleges, universities, and state agencies, continuing professional education for teachers (inservices and graduate school) will be as accessible as their own classroom.

3. Special education. The movement in special education is towards the inclusion of special needs students in the regular classroom. These students may have larger space requirements than the regular student and could require the assistance of additional staff. (11).

   Programming Considerations:

   The movement in special education is towards the inclusion of special needs students in the regular classroom. The implications for facilities may be larger spaces for general instruction (approximately 10-15 percent larger).

   Conference and office areas will be necessary for meetings and IEP (Individualized Education Program) development.

   Consistent with current requirements for special needs students, ramps and elevators will take the place of stairs in buildings with elevation changes.

   Support staff may need work and planning areas.

7. Extended hours/year round access. The traditional school day and year is being challenged in many communities. In addition, some schools have chosen a year-round rotating schedule for students, thereby increasing building capacity by as much as 20 to 25 percent. An extended day or year round facility has several unique programming characteristics. (2).

   Programming Considerations:

   The facilities should be designed with materials that are durable and easily maintained. Constant use requires constant cleaning.

   The facility should be climate controlled and make take advantage of advancements in window design, insulation, and solar energy technology.

   Increased daily hours and concerns about building security should be reflected in the design of the facility. Security "zoning" may restrict access to certain areas at certain times of the day. Schools in high crime areas may consider metal detectors in entrance and classroom doorways.

   Increased use of facilities by community groups or year-round programs may require additional specialized storage areas.

   Electronic access to school library/media/research resources may be made available to community or after-hours users through computer networks or interactive television . This 24-hour access requires specialized electrical and communications wiring.

8. Cultural diversity and school facilities. The U.S. population increasingly reflects minority groups. Within a decade, one in every three students will come from a minority background. At some point in the future, the "majority" population will consist of groups of "minorities." Future curriculum content will address the issue of diverse cultural values and languages. Multidisciplinary teams will facilitate study of ethnic art, architecture, food, history, government, and literature as well as language. (5)

   Programming Considerations:

   Increased flexibility in school architecture, room decor, and display centers may serve as a medium to reflect a variety of ethnic cultures.

   Interactive television classroom facilities will permit foreign language students the opportunity to talk face-to-face with students of other cities, states, or nations.

9. Financing future facilities. The financing of future educational facilities may not have a large impact on the educational specifications. However, it may effect the size of the facility and the quality of construction.(10).

   Programming Considerations:

   Given the trend of diminished financial support for education and if the facility is designed to only house the educational program, then the facility will probably be of the "bare-bones" variety.

   If the facility is designed to be a community center which houses a variety of service agencies and the educational program, then the design of the facility and the quality of furnishings and systems will be more substantial based upon a larger, shared financial base.

10. The multi-location multi-media educational experience. In the future it is likely that a stronger link will exist between the resources of the school, community, and industry. Students may have physical or electronic access to community resources such as libraries, museums, concert halls, colleges, government centers, retail establishments, health centers, and research and production facilities. In turn, when industry needs people with new skills, the school will respond with retraining programs or facility access. (12).

    Programming Considerations:

    Additional learning opportunities may be available through a home-school-industry-world technology connection. This connection is at present predominantly voice, video, and data (predominantly computer), but could include interactive video or more advanced technologies in the near future. This home learning environment will not supplant the school (socialization and culture is still an important function of the school) but will supplement the school's learning environment. The implications for schools (and homes) are multi-media or hyper-learning areas, decisions on types of technology (or even standardization of technology), and the appropriate access connections (fiber optic, cellular, electrical, etc).

Industry retraining will be assisted at the local level by physical or electronic access to the school (conference or classrooms, interactive television rooms, computer access). Interactive, multimedia technology in the schools or even at the industry site may provide the networking capability for large scale, multi-site retraining.

Students in the future are likely to gain additional education and experience off of school grounds by visiting community and industry resources. The implication for schools might be office space for coordination of activities.

11. The school as a pre-school and before- and after-school care center. The number of single parent households and households in which both parents work is increasing dramatically. Teenage pregnancy is on the rise. The need for affordable, developmentally appropriate pre-school or child care programs is evident. Unfortunately, child care programs that are of high quality are also expensive or limited. Research has shown that developmentally appropriate pre-school educational programs are cost effective because they reduce grade failure and dropout rates. Future school offerings will include pre-school programs and before- and after-school care. (3).

Programming Considerations:

Educational, play and classroom toilet areas, along with classroom furniture should be scaled to the physical size of the students.

Pre-school facilities should be located in proximity to primary school classrooms and out of the traffic pattern of upper grade students.

Classroom furnishings should encourage small group activities and exploration of materials and ideas.

Facilities for pre-school and extended day programs should incorporate or provide access to food service areas that are safe for child and adult use.

Personal storage areas (cubbies or mini-lockers) should be made available to all pre-school or extended day students. Additional storage for extended day classroom resources is desirable.

For safety, pre-school and extended day programs should be located in controlled areas that are restricted access.

12. Service agencies/prevention services for at-risk children. Schools and service agencies have begun to recognize the importance of coordinating their efforts to assist at-risk children. Early intervention and prevention programs representing a variety of agencies will be housed at the local

> school, thereby providing a comprehensive and concerted effort to meet the physical, intellectual, emotional, and social needs of all students. (4).
>
> Programming Considerations:
>
> As a community center, the school may cooperate with outside agencies and centers to cooperatively house their programs under one roof. Service spaces could include such options as a psychologist, social welfare worker, food service, or even minor health/medical (including prenatal) and dental.
>
> A variety of spaces may be needed, ranging from specialized rooms pertinent to the services offered, separate or common office spaces, and conference/meeting rooms.
>
> Decisions related to separate or centralized record keeping and access to those records should be addressed. Electronic record keeping may facilitate the interaction between service agencies and the school.
>
> The broadened nature of offered services should result in equally broadened financial capability to provide such a facility.
>
> Student security may be addressed through scheduling of services, duplication of entrances (community/outside and school/inside), or the zoning of service agency areas.
>
> Community volunteers will provide nurturing experiences (reading, teaching) to at-risk students. A variety of comfortable, small group areas will be used for this contact.

One of the most recent publications on future school facilities is Schools for the Twenty-first Century.[1] In this publication, the California Department of Education suggested eleven design themes for school districts to consider when constructing new facilities. Though not available during the inception of this study, strong similarities exist between eight of the California Department of Education's design themes and the results of this study. The similar themes are noted below with "stars." These similarities serve as a means of validating this study's results through "triangulation."

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[1] California State Department of Education, Schools for the 21st Century (Sacremento, CA: California Department of Education, 1990).

The results of this study indicate that future educational facility needs will be characterized by eight themes. These themes are:

1. electronic media in curriculum, instruction, and assessment;*
2. a variety of instructional methods and strategies;*
3. the community use of facilities;*
4. flexibility in school facilities;*
5. teacher planning and professional development;*
6. special education;
7. extended hours/year round access;* and
8. cultural diversity and school facilities.

In addition, four other themes are supported as being probable indicators of future educational facility needs.

9. financing future facilities;
10. the multi-location, multi-media educational experience;
11. the school as a pre-school and before- and after-school care center;* and
12. service agencies/prevention services for at-risk children.*

Summary

The results of the five rounds of the Delphi survey were presented in this chapter. Consensus was reached in rounds two and five as to the probable social and technological futures for education, and to the probable effect of these futures on future school facilities.

CHAPTER 7

Summary, Conclusions, and Recommendations

In this chapter, the findings of the study have been summarized, conclusions have been drawn from the findings, and finally recommendations made by the researcher for the appropriate audiences and for future researchers. The four research questions that guided this study are presented as a review and as a framework for this chapter. The researcher sought explanations to the following questions:

1. What are the major societal, technological, and environmental factors which will impact education in the future?
2. What effect will these factors have on future educational facility needs?
3. What will be the educational specifications (characteristics) for school facilities of the future?
4. What characteristic themes underlie future educational specifications and what impact might they have on the architectural design of future school facilities?

Summary

This study involved the administration of five iterative rounds of a Delphi survey instrument. The first and second round survey instrument was designed to determine the major societal, technological, and environmental factors which will impact education in the future. The third, fourth, and fifth rounds of the survey were designed to determine the effect that the first and second round findings would have on future educational facilities. Two samples of reputationally nominated futurists, architects, and educators were used for the study. Due to the extensive nature of the survey instruments, the first reputational sample completed only the first two survey instruments, while the second reputational sample completed only the third, fourth, and fifth round survey instruments. Qualitative and/or quantitative feedback on the findings of the previous survey round was given to participants prior to responding to the second, third, fourth, and fifth round survey instrument.

The value of the iterative rounds in helping participants to brainstorm ideas and develop group consensus was only judged subjectively. However, by comparing the written responses, frequency distributions, and means for the first and second round survey instrument (Appendix F and Tables 6.1 and 6.2), a researcher would judge that brainstorming had occurred and that group consensus was developed. Further, by reading the written responses to rounds three and four (Appendices H and I), a researcher would judge that brainstorming had occurred and that group consensus was developed as, by their written comments, respondents rejected or accepted the ideas of their peers. Finally, by reading the frequency distributions and means for round five (Appendix K), a researcher would judge that group consensus was again developed.

Research Question One

Analysis of the second round survey responses provides a consensual answer to the first research question, "What are the major societal, technological and environmental factors which will impact education in the future?." Of the forty-four forecasts presented on the instrument, twenty-eight were rated by the sample group as being probable to highly probable and sixteen were rated as somewhat probable or lower. The twenty-eight probable to highly probable forecasts are summarized below starting with the most probable and ranging to the least probable. Forecasts with identical probabilities are noted by identical forecast numbers.

1. Large corporations will offer some means of formal or informal education for their employees in the future.

2. A greater proportion of tomorrow's students will come from a single parent household, a background of poverty, or a minority heritage with parents of a below-average educational level.

2. Computer technology will become an integral part in the diagnosis, instruction, and monitoring of student progress.

2. Businesses will increasingly demand greater skills of high school graduates in problem solving, communications, and computer literacy.

2. There will be an increase in public attention to social and environmental issues.

6. Future curriculum content will address the issue of diverse cultural values and languages.

7. There will be a continued globalization of economic markets, communications, and finance with an increased foreign ownership of U.S. industries and increased U.S. exports to foreign countries.

8. Information technology will blur the barrier between work, school, and home, resulting in an indeterminate work/school day.

9. Economic rather than military strength will determine tomorrow's superpowers, and global leadership in science and technology will determine economic strength.

10. Distance learning will be used extensively to bring quality, comprehensive learning experiences to all students.

10. A more efficient kind of information internet will be developed that can be accessed and used easily from any site.

10. Fiber optic networks will link homes throughout the U.S. to business, educational institutions and services.

13. There will be a rise in the percentage of students enrolled in alternative schooling programs (year-round classrooms, magnet schools and home schooling).

14. Economic differences between double income families and single parent families will increase, resulting in the development of technological haves and have nots in society.

14. The United States will move from an industrial based to an information based economy, where the key components are human intelligence, specialized data processing, and biological engineering.

16. The use of powerful information technologies in schools will force the redefinition of the roles of building administrators, teachers, and learners.

17. New elementary schools will be planned and designed as community schools, with social agencies physically located in the facility and working closely with school personnel.

18. School districts will turn to private donations and foundations to supplement appropriations from local, state, and federal governments.

18. Public schools will educate not only students from the traditional ages of 5-17, but also older, even retired, adults. This may include weekend or evening programs.

18. "Virtual reality" will become a tool for teaching, particularly geography, history, science, and someday math.

18. Inequities in funding of public schools will result in court ordered restructuring of educational finances.

22. Through computer technology and networking, small companies will be able to compete successfully with large firms. Networks or management teams will replace management hierarchies in most corporations.

23. The relationship between learning, technology, and physical facilities will play a major role in restructuring education and the planning of new schools.

24. In the future, promotion between grade levels and graduation will be based upon the individual mastery of educational concepts and not by age.

24. Volunteering, off-campus programs, learning in the community, helping others, tutoring, working/studying in social agencies and hospitals, will dramatically increase in the coming years.

26. The problems exhibited by children born to drug addicted mothers will cause educators to alter the approaches they utilize in educating children. New definitions for achievement may result and categories of special education may be expanded.

26. Just as the office at home is already a reality, the classroom at home will be a supplement to formal school classrooms.

26. Learning (computer based) will become a national (and global) network-based process. There will be a cross boundary fertilization of education and educational ideas, i.e. U.S.-Japan interchange.

Research Question Two

Qualitative analysis of the responses to the third and fourth round survey assisted the researcher in reducing the collected data and in developing thematic responses to the second research question, "What effect will these (societal, technological and environmental) factors have on future educational facility needs?" The response to this research question served as a basis for the fifth round survey instrument and therefore was validated by the study participants. Of the twelve themes presented on the fifth round instrument, eight were rated as probable to highly probable, the remaining four themes were rated as somewhat probable to probable. The twelve thematic effects are summarized below in order of their probability, ranging from most probable to least probable. Themes with identical probabilities are noted by identical numbers.

Future school facilities will be effected by many societal, technological, and environmental factors. As a result of these factors, school officials, architects, and decision makers may need to address the facility needs listed below.

1. Electronic media will be more widely used in curriculum, instruction, and assessment. Facility planners will need to consider how to fully incorporate a changing technology into a variety of flexibly arranged instructional areas.

1. There will be a variety of instructional methods, strategies and groupings. Learning can be enhanced by flexibility or variety in instructional spaces (so as to facilitate individualized, small group, whole class, multi-age, or multidisciplinary groupings).

3. Schools will be designed to permit greater use by the community, including increased use among the pre-school, adult, and geriatric age groups.

3. Schools must be designed not only for present needs, but also, for yet unforseen future needs. Planning should incorporate adaptability and flexibility.

3. In order to stay abreast of the advancements in education, teachers will need collaborative planning areas and technology links to sources of professional development.

3. The movement in special education towards the inclusion of special needs students in the regular classroom may result in larger classroom sizes or areas for teacher aides.

7. Increased use by students and the community may require the facility to be open for extended hours or year round access.

8. The design of the school should reflect the multicultural diversity of its students in its architecture, decor and multidisciplinary instructional areas.

9. A continuing lack of financial support for school facilities may adversely effect the size of future school facilities and the quality of their construction. The exception to this may lie in joint school district and community ownership of the facility, hence a more substantial, shared financial base.

10. Schools of the future may become a multi-location, multi-media educational experience. Greater physical and electronic links will be developed between the resources of the school, community, nation, and industry. The school facility must be designed to incorporate these links.

11. Future school offerings may include pre-school programs and before- and after-school child care.

12. The growth in the number of at-risk children may result in a more coordinated effort between local service agencies and the school, including the housing of these service agencies in the local school facility.

Research Questions Three and Four

Research questions three and four refer to what will be the educational specifications (characteristics) for future school facilities and what characteristic themes underlie these future educational specifications. The general specifications are summed below underneath their themes.

1. Electronic media in curriculum, instruction, and assessment.

*A variety of technologies, not just one specific technology as in "fiber optics."
*All areas wired for the possibility of two-way interactive television (distance learning).
*Lighting and acoustics to facilitate audio/video transmission.
*Community access to distance learning areas.
*Conduits and connections to facilitate eventual use of "virtual reality."
*Increased electrical outlets, student workstations, and electronic networking to enable students to use computers from anywhere in or outside the facility.

2. A variety of instructional methods and strategies.

*Teacher access to common planning areas, including technology access.
*A variety of flexibly arranged instructional spaces (individual study spaces, small group areas, seminar spaces and large open areas all of which may be reconfigured or modified as needed)
*Access to technology (upgradeable) in all instructional areas.
*Adequacy of electrical, computer, audio and visual network connections.
*Artificial lighting, climate control and sound absorbing wall, ceiling and floor materials.

3. The community use of facilities.

*Security zoning may limit certain areas of the facility, but permit after hours access to others for extended hours community use.
*Community access to meeting rooms, recreational facilities, libraries, food service facilities and possibly specialized labs.
*Pedestrian and auto access, links to parks, and sufficient night lighting.
*Increased and possibly specialized storage areas.
*Constructed of materials that are durable and easily maintained.

4. Flexibility in school facilities.

*Designed with principles of flexibility, adaptability, adequacy and efficiency.
*A variety of classroom shapes, sizes and furnishings. This variety will be enhanced by movable walls and utilities to facilitate changing group structures for learning. Gone will be the traditional, standardized classroom placed in an " egg carton" down both sides of a long hallway.
*Possible use of modular facilities in areas of radical enrollment fluctuations (these should not be confused with converted mobile homes).

5. Teacher planning and professional development.

*Improved office areas for teachers with electronic media access.
*Teachers will need cooperative planning areas (departmentalized and interdisciplinary).
*Access to continuing professional development through the use of interactive television technology and colleges, universities and state agencies.

6. Special education.

*Larger classroom spaces for general instruction (10-15% larger).
*Ramps and elevators instead of stairs.
*Office areas and access to conference areas for meetings.
*Work and planning areas for support staff.

7. Extended hours/year round access.

*The facility should be climate controlled and make take advantage of advancements in window design, insulation and solar energy technology.
*Security zoning may limit certain areas of the facility, but permit after hours access to others for extended hours community use.
*Constructed of materials that are durable and easily maintained.
*Electronic access by community or after-hours users to school library/media/ research resources through computer networks or interactive television .

8. Cultural diversity and school facilities.
*School architecture and room decor will reflect a variety of ethnic cultures.
*Interactive television classroom facilities will permit foreign language students the opportunity to talk face-to-face with students of other cities or nations.

9. Financing future facilities.

*The size of future facilities and the quality of their furnishings will be dependent upon the financial base of the school district. Given the trend of diminished financial support for education the facility will probably be of the "bare-bones" variety. However, if the facility is designed to be a community center which houses a variety of service agencies and the educational program, then the design of the facility and the quality of furnishings and systems will be more substantial based upon a larger, shared financial base.

10. The multi-location multi-media educational experience.

*The implications for schools (and homes) are multi-media or hyper-learning areas, decisions on types of technology (or even standardization of technology) and the appropriate access connections (fiber optic, cellular, electrical, etc).
*Physical or electronic access (conference rooms or interactive television facilities) between the school, community resources, and industry will provide realistic educational situations for students, and the capability for large scale, multi-site re-training for industry.

11. The school as a pre-school and before- and after-school care center.

*Educational and play areas, along with classroom furniture, scaled to the physical size of the students.
*Pre-school facilities located in proximity to primary school classrooms and out of the traffic pattern of upper grade students.
*Classroom furnishings that encourage small group activities and exploration of materials and ideas.
*Access to food service areas that are safe for child and adult use.
*Personal storage areas (cubbies or mini-classroom lockers) for pre-schoolers.

12. Service agencies/prevention services for at-risk children.

*Possible service spaces for a psychologist, social welfare worker, food service or even minor health/medical housed in the school.
*Possible central office/electronic record keeping area for common school/ service agency records. Common record keeping may facilitate the interaction between service agencies and the school.
*A variety of comfortable, small group areas for community volunteers to provide nurturing experiences (reading, teaching) to at risk students.
*The broadened nature of offered services should result in equally broadened financial capability to provide such a facility.
*Student security may be addressed through scheduling of services, duplication of entrances (community/outside and school/inside) or the zoning of service agency areas.
*A variety of spaces may be needed, ranging from specialized rooms pertinent to the services offered, separate or common office spaces and conference/meeting rooms.

Conclusions

The conclusions will be presented in two categories. First, conclusions pertaining to the methodology will be presented. Second, conclusions pertaining to the survey results will be presented.

Methodological Conclusions

The Delphi survey instrument and reputational sampling technique were found to be a viable, though time-consuming, means of having leaders from the fields of architecture, education, and futurism discuss and develop consensus about educational futures and school facilities.

By reputational sampling, two highly focused, nationally recognized groups of individuals were developed for administration in this study. The selective process assisted in maintaining a higher than average response rate from survey round to survey round (particularly given the lengthy and extensive nature of the survey instruments). The percentage of eligible round one respondents returning the round two survey instrument was 100 percent, the percentage of round three respondents returning the fourth round survey instrument was 87 percent, and the percentage of round three respondents returning the fifth round survey instrument was 80 percent.

The Delphi process and survey instruments did provide an environment for group interaction, brainstorming, and reasoned group judgement without the inherent problems associated with face-to-face interaction. Comments concerning new ideas were greater in the initial rounds of each portion of the study (rounds one, three, and four) and consensus generation was greatest among the final rounds of each portion of the study (rounds two, four, and five). Interaction among the participants was greatest in the round four instrument, with a majority being positive comments and approvals concerning other participants' third round responses. Negative comments were fewer and for the most part not directed at individuals but at their ideas.

Survey Conclusions

This study facilitated a reasoned group opinion as to futures that will effect education and the resultant effects on future educational facilities. Using reputational sampling and the Delphi technique, this study was used to provide a reputationally elite, reasoned consensus that has been notably lacking in the limited literature on future school facilities. This study has expanded the information base on educational futures and the information base on future educational facilities, particularly the use of the Delphi technique in architectural programming.

Recommendations

Further study of the process and instruments developed for use in this study are recommended. Though effective in meeting the study's research objectives, technical refinement of both the methodology and instrument is needed.

First, the reputational sampling process, though effective, is time and effort consuming. Reducing the number of nomination rounds from three to two may reduce the amount of time and effort necessary to obtain a legitimate sample. Subjective judgement would suggest that this could be accomplished without a significant reduction in the validity of the sample. Additional studies in this area could lend direction as to the optimum number of nominating rounds necessary for valid samples.

Second, the number of scenarios and forecasts from which participants are expected to respond should be reduced so that participants are dealing with only the "essential" questions. Marginal notes from participants and subjective judgement on part of the researcher would suggest that twenty-eight forecasts are excessive and that reducing this number in other studies to ten to twelve would be appropriate. In addition, a large number of forecasts combined with an equally large number of participants could result in an amount of response data too large to manage or analyze. Other researchers in this area should remember to keep their studies simple; the essential number of participants focused on the essential questions.

Third, though not utilized in this study, statistical analysis of the participants' responses across survey rounds could be conducted to determine the effect of feedback on change in group or individual responses. Marginal notes from participants and subjective judgement would suggest that in this study the Delphi technique was effective in developing group consensus.

Fourth, in the future other researchers may choose to replicate this study to update the results. Additionally, researchers in the future may wish to make comparison between the results of this study and the actual effect on school facilities.

Fifth, the results of this study should not be used as a panacea for the design of future school facilities. The themes and architectural considerations resulting from this study may be accurate and appropriate to many future school facilities. However, they can not be accurate and appropriate for all future school facilities. Though generalizable to future school facilities as a whole, the results of this study should only serve as a basis for initial dialogue between architects, educators, and decision makers as they determine specific future educational needs and facilities on the local level.

Finally, valuable information concerning methodology, educational futures, and future school facilities was collected as a result of this study. It will hopefully assist school district personnel, architects, and decision makers in developing school facilities that are not only architecturally appropriate for future educational programs but that may even help to facilitate future educational change. If this is the result, it has been worth the challenge.

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Appendix A

Reputational Sampling Letters

Reputational Sampling Response Sheets

Kelvin McMillin
Department of Education Administration
1204 Seaton Hall
University of Nebraska-Lincoln
Lincoln NE 68588-0638
July 4, 1991

Name
Publication
Street
City, State, Zip Code

Dear Name:

In many of the elementary and secondary schools across this nation, school boards and administrators are wrestling with a perplexing problem, how to educate students in facilities that are structurally sound but that are inadequate to house the educational programs of today's changed curriculum. School facilities constructed only twenty years ago were adequate to house then existing enrollments, but changes in school offerings such as equality of the sexes in athletics, computers, and even education for the handicapped, disadvantaged and gifted have resulted in the programmatic overcrowding of today's school buildings. This gap between changing school programs and fixed educational facilities is expected to widen in the future.

With the above thought in mind, I have prepared a Delphi study concerning the impact of the future on tomorrow's educational programs and school facilities. In preparation for this study, I am trying to identify those prominent academics and authors having an expressed interest in the future. As an editor of a prominent journal, you have access, knowledge and a definite opinion concerning who are today's most prominent academics and authors in this field. Therefore, I seek your assistance in developing a reputational register of these prominent people.

I hope you will join me in this endeavor, by briefly composing a short list of prominent futurists on the enclosed form. With this study, a strong perspective of the social and technological future is just as important as expertise in education or architecture. A diversity of backgrounds is acceptable and encouraged. A postage paid envelope has been enclosed for your return.

Your opinion of the most prominent futurists is very important to this study and your participation will greatly enhance the success of this project. My sincerest appreciation for your assistance in this matter.

Sincerely,

Kelvin McMillin

Enc.

Noted Futurists

Name: ________________________________
Organization: ________________________________
Department: ________________________________
Street: ________________________________
City,State,Zip: ________________________________
Telephone: (   ) ________________

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Telephone: (   ) ________________

Kelvin McMillin
Department of Education Administration
1204 Seaton Hall
University of Nebraska
Lincoln NE 68588-0638
September 4, 1991

Name
Organization
Street
City, State, Zip Code

Dear Name:

In many of the elementary and secondary schools across this nation, school boards and administrators are wrestling with a perplexing problem, how to educate students in facilities that are structurally sound but that are inadequate to house the educational programs of today's changed curriculum.

School facilities constructed only twenty-five years ago were adequate to house then existing enrollments and programs. However, changes in school offerings such as education of the handicapped, disadvantaged and gifted; equality of the sexes in athletics; and even computer education have resulted in the programmatic overcrowding of these school facilities. The gap between an evolving school curriculum and the relatively fixed nature of older educational facilities can be expected to widen in the future.

With the above thought in mind, I have developed a Delphi study to examine the impact of the social and technological future on elementary and secondary education, including its effect on the design of future school facilities. In a recent inquiry to journal editors, your name was given to me as a person who has expertise in this area, and who could suggest others with similar qualifications.

In preparation for this study, I am developing a list of prominent educators, architects and futurists having an interest in the future of education and educational facilities. With this study, a strong perspective of the social and technological future is just as important as expertise in education or architecture. A diversity of backgrounds is acceptable and encouraged. I hope you will join me in this endeavor by composing a short list of peer professionals whom you feel have interest and expertise in this area.. A postage paid envelope has been enclosed for your confidential return. I ask that you please respond by September 28, 1991.

Your opinion of the most prominent futurists, educators and architects is very important to this study and your participation will greatly enhance the success of this project. My sincerest appreciation for your assistance in this matter.

Sincerely,

Kelvin McMillin

Enc.

Noted Futurists

Name: ______________________
Organization: ______________________
Department: ______________________
Street: ______________________
City,State,Zip: ______________________
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Kelvin McMillin
Department of Education Administration
1204 Seaton Hall
University of Nebraska
Lincoln NE 68588-0638
November 4, 1991

Name
Organization
Street
City, State, Zip Code

Dear Name:

In many of the elementary and secondary schools across this nation, school boards and administrators are wrestling with a perplexing problem, how to educate students in facilities that are structurally sound but that are inadequate to house the educational programs of today's changed curriculum.

School facilities constructed only twenty-five years ago were adequate to house then existing enrollments and programs. However, changes in school offerings such as education of the handicapped, disadvantaged and gifted; equality of the sexes in athletics; and even computer education have resulted in the programmatic overcrowding of these school facilities. The gap between an evolving school curriculum and the relatively fixed nature of older educational facilities can be expected to widen in the future.

With the above thought in mind, I have developed a Delphi study to examine the impact of the social and technological future on elementary and secondary education, including its effect on the design of future school facilities. In a recent inquiry to reputationally elite architects, futurists and educators, your name was given as a person who has expertise in this area, and who could suggest others with similar qualifications.

In preparation for this study, I am developing a list of prominent educators, architects and futurists having an interest in the future of education and educational facilities. With this study, a strong perspective of the social and technological future is just as important as expertise in education or architecture. A diversity of backgrounds is acceptable and encouraged. I hope you will join me in this endeavor by composing a short list of peer professionals whom you feel have interest and expertise in this area.. A postage paid envelope has been enclosed for your confidential return. I ask that you please respond by November 28, 1991.

Your opinion of the most prominent futurists, educators and architects is very important to this study and your participation will greatly enhance the success of this project. My sincerest appreciation for your assistance in this matter.

Sincerely,

Kelvin McMillin

Enc.

Noted Futurists

Name: ______________________________
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Appendix B

Pilot Study: Round One Survey Instrument

Architectural Concerns

for

Future Learning Environments

University of Nebraska-Lincoln
October 1990

1221A Seaton Hall
University of Nebraska-Lincoln
Lincoln, Nebraska 68588-0638
1-800-742-8800 Ext. 3726

Dear Colleague:

In many of the elementary and secondary schools across this nation, school boards and administrators are wrestling with a perplexing problem, how to educate students in facilities that are structurally sound but that are quickly becoming inadequate to house the educational programs of today's changed curriculum. School facilities designed and constructed only twenty years ago were adequate to house existing enrollments, but changes in school offerings such as education for the handicapped, disadvantaged, gifted, and computer technology, have precipitated the remodeling and overcrowding of today's school buildings.

American architect Louis Sullivan once stated, that "form ever follows function," a principle that in essence asserts that the design of a building must logically be based upon the activity housed within it. In the case of school facilities, the form of the school building is static throughout the forty to ninety year lifespan of the building, but the function of education often changes dramatically during this time period. Due to evolving school programs and services, the lengthy lifespan of the typical school building, and the substantial fiscal commitment required from the community for remodeling or new construction, school structures must be designed with future function and form in mind.

The question I seek to answer is "based upon the predictions made by educational futurists, what type of facility will be necessary to house tomorrow's students?".

As a leader in your field, with an expressed interest in the future, I am seeking your assistance in developing a clearer perception of tomorrow's school facilities. I hope you will join me in this endeavor, by briefly commenting on the enclosed educational futures. Each future scenario is followed by a short prediction statement, a probability Likert scale, a time line, and a section where you can briefly describe the impact that that prediction will have on future school facilities. A sample prediction from fifteen years ago has been included on the next page. Please fill in time lines and probabilities for every prediction, but if you feel that a suggested prediction will have no impact on future school facilities, leave that section blank. Your creativity, expertise and vision can greatly enhance the success of this project. Therefore, your participation is very important and greatly appreciated.

Sincerely,

Kelvin L. McMillin

SAMPLE

Section 504 of the Rehabilitation Act of 1973.

No otherwise qualified handicapped individual in the United States . . . shall solely by reason of his handicap, be excluded from participation in, or be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance. . .

Education for All Handicapped Children Act of 1975

States receiving Federal financial assistance must identify handicapped children and provide a "free appropriate public education which emphasizes special education and related services designed to meet their unique needs."

Prediction: The public schools of this nation will educate all children of their district, including those that are physically or mentally handicapped.

Probability of the above future prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(1) Social demand for education will increase while public expenditure for education will continue to be restricted. Government role will remain limited, but more federal funds may be spent in "matching" local efforts to finance educational innovations and research. Programs that enhance the basic curriculum may be financed through alternative means such as foundations.

Prediction: School districts will turn to private donations and foundations to supplement appropriations from local, state and federal governments. These funds will not be meant to replace government funds, but to enhance them.

Probability of the above future prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(2) Future educational systems will require a more open and flexible system of management that encourages participation by people at all levels. In addition, it signals a reduction in school administrative bureaucracy, as decision making powers are moved to the individual school building, teachers and principals (site based management).

Prediction: Management and decision making authority will be transferred from the superintendent's office to the individual school building level.

Probability of the above future prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(3) Modern medicine will result in a healthier and older population as the average human lifespan will increase over previous generations. Increases in the number, power and resourcefulness of older Americans will render obsolete many of our social and business assumptions about what it means to be an older adult. The "Age Wave" will cause increased emphasis on lifelong learning, personal growth, and transgenerational families. The aging of the American population will give Americans the opportunity to live well and live long, drawing much from life, but also provide them the time and energy to give more back, enriching school, society and themselves with the special qualities and deep experiences of long life.

In a related nature, schools will increasingly tap a generally neglected source of student and teacher assistance, the volunteer. In 1988 over one million people volunteered to work in America's schools as tutoring students, assisting immigrant children in improving English language skills, helping with field trips, assisting librarians, acting as mentors and role models. In the future this huge resource will be utilized in greater quantities, but will not be considered a substitute for public funding.

Prediction "3A": Public Schools of the future will be called upon to educate not only students from the traditional ages of 5-17, but also older, even retired, adults. This expanded "adult education" role may include weekend or evening programs.

Prediction "3B": In the future, schools will increasingly utilize volunteer workers, of which may include older or retired adults.

Probability of prediction "3A" (adult education) becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction "3A" will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon prediction "3A" (adult education), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

Prediction "3B": In the future, schools will increasingly utilize volunteer workers, of which may include older or retired adults.

Probability of prediction "3B" (volunteer assistance) becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction "3B" will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon prediction "3B" (volunteer assistance), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(4) Technology will continue to expand. Computers in the school building will become more commonplace as new strategies of integrating them into the curriculum, and into administration, are developed. Computers will be used to test a student's mastery of concepts and then provide appropriate remedial instruction for unmastered areas. Student progress will be monitored by computer and teachers will have immediate access to a listing of mastered and unmastered student competencies.

To develop the necessary abilities to achieve the above prediction, the percentage of the educational budget spent on software, research and development will be expanded to match similar percentages used by business and industry (education spends the majority of their computer budget on hardware, industry spends most of their's on research, development, and training).

Through the use of computer networks and data bases, school children will have ready access to other schools, universities or even the Library of Congress from their classroom. Teachers and administrators will have computer access to their counterparts in other districts, thereby sharing ideas and expertise.

Prediction "4A": Computer technology will become an integral part in the diagnosis of student needs, the development of prescriptive instruction, and the monitoring of student progress.

Prediction "4B": The availability of a computer and modem in the classroom and the office will allow students, teachers, and administrators to "network" with other schools in the area and other data bases. Intra/interschool communication will increase, and electronic mail will receive more use than the memo or telephone

Probability of prediction "4A" (diagnosis, prescription, monitoring) becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction "4A" will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction (prediction "4A"), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program.________________________________

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Probability of prediction "4B" (intra/interschool/database communication) becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction "4B" will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction (4B), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(5) Future curriculum content will include "peace," "global" and "environmental" education. Education will help students appreciate the concept of peace, develop intercultural understanding, provide a future orientation, promote social justice and stimulate a respect for life. Students will develop an understanding of the finality of nuclear war, the effect of Third World revolution, the impact of mass hunger and an uncertain economy. Students will develop authentic planetary consciousness and become active in the preservation of their environment and world. Global warming and loss of rain forests are a true problem, that impacts everyone regardless of location. Education will help students adapt to the new imperatives of world economic and technological competition.

Prediction "5A": Future curriculum content will seek to develop in students, an appreciation for world peace.

Prediction "5B": Future curriculum content will seek to develop in students, a sincere concern for the environment.

Prediction "5C": Future curriculum content will seek to develop in students, an appreciation and understanding of the value of other cultures.

Probability of prediction 5A (appreciate peace) becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction "5A" will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction (5A), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

Probability of prediction "5B" (environmental concern) becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction "5B" will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction (5B), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

Probability of prediction "5C" (cultural awareness) becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction "5C" will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction (5C), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(6) Distance learning, the live, two-way interaction of teachers and students at different locations via satellites, television, computer or cable, will increase dramatically in the future. Technology currently exists that makes distance learning a viable educational instruction tool. In the future, distance learning will encompass not only the rural school, but will be used to bring a wide variety of experts and information into all classrooms, rural or urban.

Prediction: In the future, distance learning will be utilized more extensively and creatively to bring learning experiences to all students.

Probability of the above future prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(7) Children's educational television is a cost-effective technology that is currently being under-utilized. In 1987 the U.S. spent about $713 per capita on elementary and secondary schools, in contrast to 12 cents per capita on programming for children's public television. Ten years of TV learning at the rate of one hour each weekday equals two full school years, a considerable amount of learning time which could enrich a child's formative years. By bringing education into the homes, via television, parents can become partners in enhancement of their children's education.

Prediction: Children's television programming will be expanded, including programs targeting disadvantaged children and older students (junior and senior high age).

Probability of the above future prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(8) Future curriculum content must prepare students for a changed world. By 2000, 95% of all jobs will involve some time spent in generating, processing, retrieving, or distributing information, in contrast to the 77% of jobs a decade ago. "By 2010, virtually every job in the country will require some skill with information-processing technology."

Prediction: Future curriculum content will rely heavily on the use of information processing machines (including computers) to develop information processing skills in students.

Probability of the above future prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(9) Teacher credentialing as we now know it (academic degrees) will be eliminated. The brightest and best people will be recruited for teaching, regardless of degree.

Prediction: Business and industry trained professionals will be utilized as classroom teachers.

Probability of the above future prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(10) The traditional elementary, jr. high/middle school, and high school grade structure will be redefined, with the grades K-4 reorganized into a single unit known as the "Basic School". "Based upon a commitment to mastery learning, the basic school asserts that all children regardless of advantage or disadvantage are capable of mastering education, given time, resources and commitment. This concept of "mastery learning" redefines education as "attaining a specified level of knowledge, rather than attendance in school for a set number of years." All students will be held accountable for mastery of basic skills and core structures, with advancement to upper grades based upon this educational mastery. The new educational system would have a great diversity of settings, methods, and technologies, with a Certificate of Capability replacing the high school diploma and the current competitive scheme of grading (A,B,C,D,F). The reorganization of the traditional school structure opens the door for a "middle school philosophy" with a grades 5-8 middle school.

Prediction "10A": In the future, grades K-4 will be organized into a single grade unit called the "Basic School."

Prediction "10B": In the future, graduation and promotion between grade levels will be based upon the mastery of educational concepts and not by age.

Probability of prediction "10A" (K-4 Basic School) becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction "10A" will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction (10A), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

Probability of prediction "10B" (Promotion by Mastery Learning) becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction "10B" will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction (10B), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(11) Parental interest in the quality of education is on the rise. Some parents have become critical of their local neighborhood schools and have begun to investigate options to this tradition, including private schools and magnet schools. Due to this public interest, some state legislatures have passed bills permitting parents and students an option in where students attend school. This option may mean an open-enrollment policy, a magnet school program, or tuition vouchers. The effect is the same, school districts will no longer be determined by physical boundaries, but by the ability to attract students to quality educational programs.

At risk students, often costly and troublesome to educate, may directly benefit from one of these strategies, the tuition voucher. Some futurists predict that at risk students will receive vouchers of larger monetary amount, thereby making them attractive clients to schools.

Prediction "11A": Magnet schools will become more common than the traditional neighborhood school.

Prediction "11B": The widespread use of the voucher system will allow any student the opportunity to attend any school they wish, public or private.

Probability of prediction "11A" (magnet schools) becoming widespread

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction "11A" will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction (11A), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

Probability of prediction "11B" (tuition vouchers) becoming widespread

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction "11B" will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction (11B), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(12) In 1989 over 31 states funded pre-kindergarten programs, quadrupling the number of a decade previous. These programs are mainly part day services provided by public school districts, for at risk four year olds.

On the private side of the coin, there is growing conviction that modern parents need more help from society in bringing up their children. This has resulted in an increasingly profitable private business, day care. Children enter private day care facilities often before the age of one, even though studies have shown detrimental effects on children this young (much of a child's adult character is formed before age four; a growing body of evidence supports that long term emotional, intellectual and cultural damage can result from infant full-time day care; the Center for Disease Control warns that day care centers are dangerous sources of infections, especially since infant immune systems are not fully effective until age four).

Prediction: The future cry is for affordable, quality day care programs, compatible with parents values, accessible to all children; and providing care and education at one facility.

Probability of future prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(13) The children of mothers addicted to alcohol and drugs, particularly "crack" cocaine, are currently entering our nations kindergartens and elementary schools. Currently, eleven percent of all children born exhibit the physical and mental effects of being born under the abuse of drugs. The effect of children being born to drug addicted mothers is tremendous, children born with I.Q.s 10 to 19 points below the norm, emotional instability, hyperactivity, and delayed development of hearing, speech, coordination, concept formation and practical reasoning. As these children reach school age and enter the classroom, teachers will be confronted with a student population that displays profound learning disabilities and maladaptive behavior disorders. In ten years, these children will have reached the age of high school.

Prediction: The effects of children born to drug addicted mothers will cause educators to alter the approach that they utilize in educating children. New definitions for achievement may result, and categories of special education may be expanded.

Probability of future prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(14) In an effort to broaden and enrich the range of educational experiences in which a student may partake, quality education will be made a community experience and a community goal. Education will be considered a lifetime activity (prenatal to the grave) with the "community" being both the teacher and the recipient.

Prediction: Schools will develop a "community of learning," a support network for students that includes mentors, parents, libraries, churches, youth groups, higher education, and business.

Probability of future prediction becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(15) The traditional notion of school day and year will be altered as the border between schooling and other modes of learning blur. This could indicate a change in what we currently define as education, in that students could obtain mastery of educational principles at another time or place than the classroom. (This would greatly expand the range of materials and mechanisms by which one could legitimately study).

Prediction: In the future, school children may gain mastery of certain educational concepts outside of the traditional school building and school day.

Probability of future prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(16) To some educational futurists, the changing of the traditional school day and year will be expressed in longer school days and year, even year-round school. (America now averages about 180 days of 6.5 hours of school per year, the Japanese average 240 days of 8 hours.

Prediction: School districts will operate extended or year-round school programs.

Probability of future prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(17) School districts may restructure the traditional high school schedule. Instead of having students change locations, subjects and activities seven to nine times each day, they may be asked to to concentrate on one or two subjects at a time in an extended "macroclass." This will allow teachers to concentrate on the learning of individual students, which is a key to increased performance.

Prediction: The class schedule will include 2-3 hour blocks of time for extended studies, instead of the current 50-55 minutes.

Probability of future prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(18) Society is growing in cultural heterogeneity. In the next twenty years the white population will decline from the present 76% to 62% of the total population. Black population will rise from 12% currently, to 15%. Hispanic population will rise from 8% to 15%. Asian population in the U.S. will rise from 3% to 8%. By 2000, nearly one-third of all school age children will be from minority groups.

The growing minority enrollment trend has two important implications: school personnel may have to adapt their teaching methods to address the different values and language abilities of minority children, and schools may become a more integral part of the social service delivery system, in that minority children are three times more likely to live in poverty than white children. Schools will need to ensure that minority children start school prepared to learn by increasing access to quality pre- and post-natal health care, by ensuring quality day care for all, and by doubling the participation in child nutrition programs.

These minority children face three main adversaries: poverty, prejudice, and the pre-conceived expectation that they will fail.

Prediction "18A": Minority students will continue to become a greater percentage of the total student population.

Prediction "18B": School personnel will need to address the issue of diverse cultural values and languages in their teaching methods and curriculum content.

Prediction "18C": School districts will begin health care and day care programs as a part of their service offerings.

Probability of prediction "18A" (growing minority enrollment) becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction "18A" will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, "18A" (growing minority enrollment) what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

____

____

____

Probability of prediction "18B" (changes in curriculum and instruction because of increased diversity of cultural values and languages) becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction "18B" will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon prediction "18B" (curriculum and instructional changes), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

Continued on next page . . .

Probability of prediction "18C" (health care/day care) becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction "18C" will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon prediction "18C" (health care/day care), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(19) Median class size will be reduced, from the current 17.8 students to 10 students.

Prediction: Median class size will be reduced, from the current 17.8 students to 10 students.

Probability of future prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

(20) As an expert in your field, you have additional knowledge and perceptions about education in the future. On the next three pages, please list any educational futures which you feel I have missed, and complete the information concerning probability, time line, and impact on school facilities. Prediction #1:

Probability of future prediction becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

Prediction #2:

Probability of future prediction becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

Prediction #3:

Probability of future prediction becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

Your assistance in this endeavor has been greatly appreciated. Thank you.

Appendix C

Pilot Study: Round Two Survey Instrument

Architectural Concerns

for

Future Learning Environments

(Final Round)

University of Nebraska-Lincoln
November 1990

1221A Seaton Hall
University of Nebraska-Lincoln
Lincoln, Nebraska 68588-0638
1-800-742-8800 Ext.3726

Dear Colleague:

The responses to the first round of questions concerning school futures and architecture were extremely interesting and informative. I think you will agree. I have enclosed the group's responses to each prediction, giving the frequency distribution and mean years till the prediction become widespread. I have also enclosed the written responses to each question concerning impact on future school facilities.

I realize that as a professional, you are an extremely busy person, therefore I have attempted to streamline the process of answering round two's questions. On the following pages you will find the predictions given to you in the first round along with means and frequency distributions for years to widespread adoption and probability of the prediction coming true. This information is for your own benefit and no further work will be done with this data.

Immediately following each prediction, you will find the group's responses on the impact that that prediction will have on future school architecture. Please read each response and then perform one of the following options:

A) If after reading all responses, you feel that the prediction will still have no effect on future school facilities then do nothing with that question, except fill in the time line as never and the probability as highly improbable.

B) If you feel that one of the responses given, clearly explains what you feel will be the impact on school architecture, then circle that one response, and at the bottom of the page fill in timeline and probability information as you did in the previous round. Please circle only one response.

C) If after reading all responses, you feel that there will be an effect on future school architecture, but that no single response clearly explains the effect, then please write what you feel the effect will be in the blank provided. Please fill in timeline and probability information as you did in the previous round.

A sample answer has been included on the next page. I thank you for your assistance in this project. Your creativity, expertise and vision has greatly enhanced the success of this research. Your participation has been very important and greatly appreciated. If you would like a copy of the results of this research, please enclose your name and address on a slip of paper when you return your survey.

Sincerely

Kelvin L. McMillin

SAMPLE

Prediction: The public schools of this nation will educate all children of their district, including those that are physically or mentally handicapped.

Probability of future prediction becoming widespread:

Frequency	
1	Highly probable. Will unquestionably occur.
3	Probable. A strong possibility that it will occur.
1	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?
Mean= 3.0 years

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Future school buildings will have elevators and ramps instead of stairs, or all school buildings will be built on one level thereby making it easier for handicapped children to maneuver from classroom to classroom.

B. There will be specialized classrooms for mentally handicapped children away from the general student classrooms.

C. Shower and toilet facilities will be changed so that students may have access if they are in a wheel chair.

D. There will be only cosmetic changes to the school building, different types of seating arrangements, etc.

E. School buildings will be three or more stories tall because of space limitations, and stairs will be replaced by circular ramps from floor to floor (similar to the ramps in parking garages).

F.

Other:____

____

____

____

____

How probable is the above selected characteristic of becoming widespread?

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(1) Prediction: School districts will turn to private donations and foundations to supplement appropriations from local, state and federal governments. These funds will not be meant to replace government funds, but to enhance them.

Probability of future prediction becoming widespread:

Frequency	
0	Highly probable. Will unquestionably occur.
4	Probable. A strong possibility that it will occur.
1	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?
Mean= 10.0 years

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. We certainly will need ramps and widened hallways to accommodate handicapped students in wheel chairs.

B. The facility should have great flexibility to accommodate community activity in evenings and weekends.

C. We will see the construction of gymnasiums, biology labs, computer labs, etc. with a plaque outside that says "Industrial Technology Wing funded by Funded by General Motors" or "The Parke-Davis Chemistry Lab" or some other company. The facility will probably be of higher standard than usually funded by local property taxes.

D. School facilities may become joint ventures with community service organizations. Both the school and the community organization could pay for and operate the facility. (i.e. a gymnasium located on the edge of the school building with doors opening into the school and outside to the community. Between 8-3 the school operates it, between 3-12 the school closes its doors and the YMCA operates it.) Similar operations could exist for library, cafeteria, pool, etc.

E. Other:____

How probable is the above selected characteristic of becoming widespread?

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(2) Prediction: Management and decision making authority will be transferred from the superintendent's office to the individual school building level.

Probability of future prediction becoming widespread:

Frequency	
0	Highly probable. Will unquestionably occur.
2	Probable. A strong possibility that it will occur.
2	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?
Mean= 22.5 years

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. A meeting room (i.e. conference room) will be necessary.

B. Additional administrative staff at each local site could create site deficiencies in space, additional staff could also create a need for more storage (record-data).

C. There will still be a need for central office spaces, but local school buildings will also need expanded areas for computer, record storage, meetings, etc.,

D. Other:

How probable is the above selected characteristic of becoming widespread?

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(3) Prediction "3A": Public Schools of the future will be called upon to educate not only students from the traditional ages of 5-17, but also older, even retired, adults. This expanded "adult education" role may include weekend or evening programs.

Probability of future prediction becoming widespread:

Frequency	
2	Highly probable. Will unquestionably occur.
2	Probable. A strong possibility that it will occur.
1	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?
Mean= 6.0 years

Based upon prediction "3A" (adult education), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Since most of this type of instruction will be occurring in the evening- an assumption- most facilities will see no increase in space needs.

B. I believe our current high school facilities can fulfill these needs.

C. We will see the introduction of a combined elementary/secondary/junior college facility all under one roof- a K-14 program. The facility must meet the needs of all three audiences.

D. Increased flexibility in school building layout and facility design. Should consider large amount of parking space for evening and weekend adult programs.

E. Other:

How probable is the above selected characteristic of becoming widespread?

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

3. Prediction "3B": In the future, schools will increasingly utilize volunteer workers, of which may include older or retired adults.

Probability of future prediction becoming widespread:
Frequency
1 Highly probable. Will unquestionably occur.
4 Probable. A strong possibility that it will occur.
0 Somewhat probable. A weak possibility that it will occur.
0 Somewhat improbable. A weak possibility that it will not occur.
0 Improbable. A strong possibility that it will not occur.
0 Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?
Mean= 5.0 years

Based upon prediction "3B" (volunteer assistance), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Remedial classrooms could create a need for more space if this space is already at capacity. The degree to which a school becomes involved in such a program will dictate the need for more space.

B. We may need more arts/crafts rooms, facilities for woodworking, "comfortable" chairs would be great in libraries and sitting areas (for reading etc.)

C. Buildings will project more "openness" so that volunteers can come and go (also if business persons and parents in the school): need areas for one-on-one and small group dialogue/work with volunteers; need comfort stations/zones for volunteers- especially senior citizens (lounges, rest rooms, etc.)

D. Other:____

How probable is the above selected characteristic of becoming widespread?

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(4) **Prediction "4A":** Computer technology will become an integral part in the diagnosis of student needs, the development of prescriptive instruction, and the monitoring of student progress.

Probability of future prediction becoming widespread:

Frequency	
3	Highly probable. Will unquestionably occur.
1	Probable. A strong possibility that it will occur.
0	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?
Mean= 5.0 years

Based upon this future prediction (prediction "4A"), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Space will be needed for a computer center in every classroom plus a computer lab (or more) depending on the size (based upon number of potential students) of the school.

B. Provide electrical and furniture systems that will be OK for computers in offices.

C. Guidance and counseling services would need to increase space to house computer terminals, etc. This could mean a rather substantial increase in space needs.

D. Computer networks in school buildings will link counselors, regular classroom teachers and remedial teachers. Regular classroom testing will be done on computers in the classroom, with students and teachers knowing results instantaneously- deficiencies will be noted by remedial teachers and appropriate work begun the next day-Counselors will receive weekly updates via computer. Extensive change in how we operate and in electrical/communication system-little change in physical school structure.

E. Educational specifications should include quality computer stations optimally located to maximize use by all students who need such.

F. Other: ______________________________

How probable is the above selected characteristic of becoming widespread?

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

4. **Prediction "4B":** The availability of a computer and modem in the classroom and the office will allow students, teachers, and administrators to "network" with other schools in the area and other data bases. Intra/Interschool communication will increase, and electronic mail will receive more use than the memo or telephone

Probability of future prediction becoming widespread:

Frequency	
2	Highly probable. Will unquestionably occur.
2	Probable. A strong possibility that it will occur.
0	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?
Mean= 5.0 years

Based upon this future prediction (4B), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. More space for computers. A separate computer room for this type of activity.

B. A central room for a district wide "mainframe computer" will be needed. Probably located between principals office, guidance counselors, and media center. It could provide record keeping for all areas, have access by all, including students calling in (via modem) homework assignments at night.

C. Provide a room to locate "stational" computer of the database system.

D. A central area should be designed to accommodate this function. It might very well become a part of the media center. Within the design, an increased number of telephone lines will be needed.

E. Other:

How probable is the above selected characteristic of becoming widespread?

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(5) **Prediction "5A":** Future curriculum content will seek to develop in students, an appreciation for world peace.

Probability of future prediction becoming widespread:

Frequency

0 Highly probable. Will unquestionably occur.
3 Probable. A strong possibility that it will occur.
2 Somewhat probable. A weak possibility that it will occur.
0 Somewhat improbable. A weak possibility that it will not occur.
0 Improbable. A strong possibility that it will not occur.
0 Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?
Mean= 6.25 years

Based upon this future prediction (5A), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Ideally, this problem would be my top priority. I believe the issue can be addressed in current facilities. Two things have to happen first. The drug issue needs to addressed more completely and teacher/student exchange programs need to be expanded.

B. Flexible areas dedicated to distance learning will be needed. Needs may range from individual quiet space to group space for interactive viewing and in class lab activities.

C. Other:____

How probable is the above selected characteristic of becoming widespread?

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(5) **Prediction "5B":** Future curriculum content will seek to develop in students, a sincere concern for the environment.

Probability of prediction "5B" (environmental concern) becoming widespread:

Probability of future prediction becoming widespread:

Frequency	
1	Highly probable. Will unquestionably occur.
3	Probable. A strong possibility that it will occur.
0	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?
Mean= 1.25 years

Based upon this future prediction (5B), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. We need facilities to collect, store items for recycling (a room for containers and areas to organize materials for collection).

B. Provide lab space to simulate environmental problems for students

C. An increase in science and social science programs. A need will arise for more space- especially in the service areas.

D. Other:

How probable is the above selected characteristic of becoming widespread?

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(5) **Prediction "5C":** Future curriculum content will seek to develop in students, an appreciation and understanding of the value of other cultures.

Probability of prediction "5C" (cultural awareness) becoming widespread:

Probability of future prediction becoming widespread:

Frequency	
0	Highly probable. Will unquestionably occur.
4	Probable. A strong possibility that it will occur.
0	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?
Mean= 3.0 years

Based upon this future prediction (5C), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. I don't believe we need a facility change- personnel are needed and offices for them.

B. Flexible areas dedicated to distance learning will be needed. Needs may range from individual quiet space to group space for interactive viewing and in class lab activities.

C. None if integrated into courses that exist. New curriculum offerings would, however, staff and need for space, especially in language and social studies areas.

D. Provide poster space (on walls) in classrooms or school building to show programs of other cultures.

E. Other:______________________________

How probable is the above selected characteristic of becoming widespread?

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(6) **Prediction:** In the future, distance learning will be utilized more extensively and creatively to bring learning experiences to all students.

Probability of future prediction becoming widespread:

Frequency	
1	Highly probable. Will unquestionably occur.
4	Probable. A strong possibility that it will occur.
0	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?
Mean= 7.0 years

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Providing "mail service" facility and tele-education equipment.

B. Flexible areas dedicated to distance learning will be needed. Needs may range from individual quiet space to group space for interactive viewing and in class lab activities.

C. Curriculum offerings would increase in language, social studies etc. Additional classroom space would be needed depending upon the type of courses offered and with consideration to additional staff.

D. A place for telephones and media equipment will be needed.

E. Classrooms will need to be designed so that "distance learning" is not just "distance lecturing."

F. Other:

How probable is the above selected characteristic of becoming widespread?

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(7) **Prediction:** Children's television programming will be expanded, including programs targeting disadvantaged children and older students (junior and senior high age).

Probability of future prediction becoming widespread:

Frequency	
0	Highly probable. Will unquestionably occur.
4	Probable. A strong possibility that it will occur.
0	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?
Mean= 10.0 years

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Children's educational television should not be introduced. Face-to-face interaction is better.

B. Each school district, or group of school districts will operate a centralized television studio of limited broadcast area. This set up would provide high school and college students with hands-on opportunity in producing and broadcasting, give additional enrichment to students in the afternoons who need it (I foresee the studio only broadcasting afternoons for education, evenings for extracurricular and board meetings),

C. Learning lab will be needed to set up the television. It will need to be accessible to students in wheel chairs (very likely) so ramps would be appropriate also.

D. Other:

How probable is the above selected characteristic of becoming widespread?

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(8) Prediction: Future curriculum content will rely heavily on the use of information processing machines (including computers) to develop information processing skills in students.

Probability of future prediction becoming widespread:

Frequency	
4	Highly probable. Will unquestionably occur.
1	Probable. A strong possibility that it will occur.
0	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?
Mean= 12.0 years

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Educational specifications should include quality computer stations optimally located to maximize use by all students who need such.

B. The regular classroom must be computerized. Probable result is the redesign of student seating arrangements and chair styles so that a computer terminal is accessible to every student or groups of 2-3 students.

C. Additional classroom space dictated by the particular participating program.

D. Provide adequate space for machines and equipment with easier access to the facility.

E. Space available ill be necessary. Location(for equipment) needs to be centrally located.

F. Other:____

How probable is the above selected characteristic of becoming widespread?

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(9) Prediction: Business and industry trained professionals will be utilized as classroom teachers.

Probability of future prediction becoming widespread:

Frequency	
0	Highly probable. Will unquestionably occur.
0	Probable. A strong possibility that it will occur.
2	Somewhat probable. A weak possibility that it will occur.
1	Somewhat improbable. A weak possibility that it will not occur.
1	Improbable. A strong possibility that it will not occur.
1	Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

Mean= 22.5 years

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. I disagree with the concept. No matter how smart someone is, they still need training in people skills and effective methods of teaching- if they are to teach long term.

B. Teaching learning space will be structured/furnished with areas that promote a team approach between student and teacher. The team would need areas, usually within the classroom for consultation, planning, self-testing, records management etc.

F. Other:______________________________

How probable is the above selected characteristic of becoming widespread?

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(10) Prediction "10A": In the future, grades K-4 will be organized into a single grade unit called the "Basic School."

Probability of future prediction becoming widespread:

Frequency	
0	Highly probable. Will unquestionably occur.
3	Probable. A strong possibility that it will occur.
2	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?
Mean= 18.75 years

Based upon this future prediction (10A), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Facilities would in many cases need to be remodeled and in some cases new spaces made available.

B. I believe it will be a long time before fifth graders will be included in the middle schools. Actually, the K-5, 6-8, 9-12 concept seems to work well in our district. If this change occurs, however, more buildings will be needed.

C. Flexible teaching/learning spaces will be a necessary item.

D. Other:

How probable is the above selected characteristic of becoming widespread?

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(10) Prediction "10B": In the future, graduation and promotion between grade levels will be based upon the mastery of educational concepts and not by age.

Probability of future prediction becoming widespread:

Frequency	
1	Highly probable. Will unquestionably occur.
2	Probable. A strong possibility that it will occur.
2	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?
Mean= 15.0 years

Based upon this future prediction (10 B), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Mastery learning is important but will be less of a reality until other social problems are solved (i.e. broken families, drugs, abuse). We will need more facilities for child care before we can predict facilities for this.

B. This could be accomplished through curricular "centers" or pods (such as an English pod, science pod, etc.) within each pod would be several teachers who would provide small group instruction. If a child masters a certain area, he moves to the next section of his pod.

C. Mastery learning will have no effect on facilities.

D. Other:

How probable is the above selected characteristic of becoming widespread?

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(11) Prediction "11A": Magnet schools will become more common than the traditional neighborhood school.

Probability of future prediction becoming widespread:

Frequency	
2	Highly probable. Will unquestionably occur.
3	Probable. A strong possibility that it will occur.
0	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?
Mean= 5.0 years

Based upon this future prediction (11A), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Increase in facility space to increase to accommodate increase in enrollment.

B. Magnet schools will require the design of more learning labs and work areas designed for hands-on experiences such as woodworking areas, music rooms, etc.

C. Public transportation systems and even dormitories will need to be considered.

D. Other:

How probable is the above selected characteristic of becoming widespread?

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(11) Prediction "11B": The widespread use of the voucher system will allow any student the opportunity to attend any school they wish, public or private.

Probability of future prediction becoming widespread:

Frequency	
2	Highly probable. Will unquestionably occur.
2	Probable. A strong possibility that it will occur.
0	Somewhat probable. A weak possibility that it will occur.
1	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?
Mean= 7.0 years

Based upon this future prediction (11B), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. The better systems will need increased space in all areas due to increased enrollment.

B. Planning of a school facility will require considering available transportation systems.

C. The reason I see this as being less probable is because private schools aren't interested in fulfilling all student needs. When a student has a problem with learning, they send them back to the public schools. What happens then creates elite schools.

D. Other:____

How probable is the above selected characteristic of becoming widespread?

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(12) **Prediction:** The future cry is for affordable, quality day care programs, compatible with parents values, accessible to all children; and providing care and education at one facility.

Probability of future prediction becoming widespread:

Frequency	
1	Highly probable. Will unquestionably occur.
4	Probable. A strong possibility that it will occur.
0	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?
Mean= 6.0 years

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Expansion in the elementary area.

B. Small classrooms for day care programs. Planning day care centers with small size in mind.

C. Child care centers will become part of most. We have already started a "Latch Key" program. It will expand and there will be a need for more space to house them, storage for their materials (food, etc.) refrigeration facilities, etc.

D. It seems clear that tomorrows schools will be day and health care providers. Facility needs would include small medical/dental clinic possibly on a part-time basis, a small area for day care with facilities appropriately sized for pre-schooler's physical and intellectual needs, and the facility must be accessible from 5:30 AM to 7:00 PM.

E. Schools in some communities can renovate existing facilities, some must build additions. They must accommodate various levels of child care from a developmental approach.

F. Other:____

How probable is the above selected characteristic of becoming widespread?

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(13) **Prediction:** The effects of children born to drug addicted mothers will cause educators to alter the approach that they utilize in educating children. New definitions for achievement may result, and categories of special education may be expanded.

Probability of future prediction becoming widespread:

Frequency	
3	Highly probable. Will unquestionably occur.
0	Probable. A strong possibility that it will occur.
2	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?
Mean= 3.0 years

A. We need more classrooms to house these student or to provide resource assistance or places for "time outs" because they frequently interfere with the learning of other students. We already have such students.

B. More remedial space as well as in the special education program area.

C. This is happening already, however, is it widespread? This phenomenon means increased demands on special education facilities. It also implicates a need for flexibility where the students are mainstreamed.

D. Other:

How probable is the above selected characteristic of becoming widespread?

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(14) **Prediction:** Schools will develop a "community of learning," a support network for students that includes mentors, parents, libraries, churches, youth groups, higher education, and business.

Probability of future prediction becoming widespread:

Frequency	
2	Highly probable. Will unquestionably occur.
2	Probable. A strong possibility that it will occur.
1	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?
Mean= 9.0 years

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Contact areas where the "community of learning" can meet in the school with students- on an individual basis or with groups of varying sizes.

B. Greater utilization of available space, probably minor additional space needed.

C. Provide facility for more evening/weekend programs. Open school facility seven days a week, run by volunteers and school employees.

D. The support network is a strong possibility. However, it really shouldn't change the structure. Simply we need to make better use of the buildings we have- to incorporate these support systems.

E. Other:

How probable is the above selected characteristic of becoming widespread?

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(15) **Prediction:** In the future, school children may gain mastery of certain educational concepts outside of the traditional school building and school day.

Probability of future prediction becoming widespread:

Frequency	
1	Highly probable. Will unquestionably occur.
2	Probable. A strong possibility that it will occur.
2	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?
Mean= 20.0 years

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. School facilities could operate comfortably and safely, providing optimal learning opportunities day or night and year round. In some areas for example this means air conditioning where it does not exist presently. It also means lighting, structures and parking that are conducive to safe and secure transport and work. This would accommodate more interface between student and society in school.

B. I believe this can be done through our business partnerships with schools without building changes. Example: we have two business partners (HyVee and American Charter) HyVee provides visits to their store and they send representatives to teach retail concepts when students study economics. American charter sends representatives to teach money counting, how to balance checkbooks, etc.

C. Other:

How probable is the above selected characteristic of becoming widespread?

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(16) **Prediction:** School districts will operate extended or year-round school programs.

Probability of future prediction becoming widespread:

Frequency
1 Highly probable. Will unquestionably occur.
4 Probable. A strong possibility that it will occur.
0 Somewhat probable. A weak possibility that it will occur.
0 Somewhat improbable. A weak possibility that it will not occur.
0 Improbable. A strong possibility that it will not occur.
0 Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?
Mean= 20.0 years

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. School facilities could operate comfortably and safely, providing optimal learning opportunities day or night and year round. In some areas for example this means air conditioning where it does not exist presently. It also means lighting, structures and parking that are conducive to safe and secure transport and work. This would accommodate more interface between student and society in school.

B. Probably not an expanded space need but a greater need for adequate maintenance and preventive maintenance.

C. Air-conditioning will be needed in areas that are hot in the summer (currently there is no school during the hottest months).

D. Other:______________________________

How probable is the above selected characteristic of becoming widespread?

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(17) **Prediction:** The class schedule will include 2-3 hour blocks of time for extended studies, instead of the current 50-55 minutes.

Probability of future prediction becoming widespread:

Frequency	
0	Highly probable. Will unquestionably occur.
0	Probable. A strong possibility that it will occur.
2	Somewhat probable. A weak possibility that it will occur.
2	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
1	Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?
Mean= 20.0 years

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. I believe this is a long time away, but it does have possibilities. I believe the structure changes would include easy accessibility to libraries, computer labs, quiet study rooms for compilation of data

B. Flexible space to accommodate changing numbers within macroclasses, a variety of teaching-learning activities and instructional technologies (e.g. cooperative learning with small discussion groups, project teams, etc.)

C. Other:

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How probable is the above selected characteristic of becoming widespread?

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(18) **Prediction "18A":** Minority students will continue to become a greater percentage of the total student population.

Probability of future prediction becoming widespread:

Frequency	
3	Highly probable. Will unquestionably occur.
2	Probable. A strong possibility that it will occur.
0	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?
Mean= 12.5 years

Based upon prediction "18A" (growing minority enrollment), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. We already have an increased number and it keeps growing. In bordering states such as Texas, Florida and California the numbers are overwhelming. Education as a Second Language (ESL) teachers and classrooms are needed.

B. Other:

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How probable is the above selected characteristic of becoming widespread?

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(18) Prediction "18B": School personnel will need to address the issue of diverse cultural values and languages in their teaching methods and curriculum content.

Probability of future prediction becoming widespread:

Frequency	
3	Highly probable. Will unquestionably occur.
2	Probable. A strong possibility that it will occur.
0	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?
Mean= 8.0 years

Based upon prediction "18B" (curriculum and instructional changes), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. We will require learning labs (and educators to facilitate them) for students to go for extra assistance.

B. Additional space needs in language-social studies areas.

C. We will need foreign language teaching facilities with audio and visual equipment.

D. Other:

How probable is the above selected characteristic of becoming widespread?

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Prediction "18C": School districts will begin health care and day care programs as a part of their service offerings.

Based upon prediction "18B" (curriculum and instructional changes), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

Probability of future prediction becoming widespread:

Frequency	
1	Highly probable. Will unquestionably occur.
4	Probable. A strong possibility that it will occur.
0	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?
Mean= 9.0 years

Based upon prediction "18C" (health care/day care), what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Increase in Health-Nurse areas. Additional areas for day care and the elementary areas.

B. Integrate health care and day care facility to the elementary school facility.

C. In some instances, contingent on the constellation of community services available schools may serve as a one-stop point-of-entry to social services for the family. (e.g. a mall concept).

D. Health/Child care facilities are essential. One area that is needed is a REST area. When children are finished with the school day and go to "Latch Key" they continue movement activities. There is no place for children to relax quietly. Some children arrive at "Latch Key" at 6:30 AM and aren't picked up until 6:00 PM. They need a quiet place to nap/rest/slow down.

E. One-stop social services as a point of entry for the family: "place" that promotes a sense of belonging to pregnant teens; facilities that provide child day care, and promote optimum parenting education for teen parents (both mothers and fathers.

F. Other:____

How probable is the above selected characteristic of becoming widespread?

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(19) **Prediction:** Median class size will be reduced, from the current 17.8 students to 10 students.

Probability of future prediction becoming widespread:

Frequency	
0	Highly probable. Will unquestionably occur.
4	Probable. A strong possibility that it will occur.
1	Somewhat probable. A weak possibility that it will occur.
0	Somewhat improbable. A weak possibility that it will not occur.
0	Improbable. A strong possibility that it will not occur.
0	Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?
Mean= 6.6 years

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Reduction in space needed in both specialized areas as well as general classroom areas.

B. Increased flexibility of classroom size.

C. Where this can occur, flexible teaching-learning areas would be very helpful. These would facilitate a variety of cooperative learning approaches.

D. Because the needs of these students are so great much individual attention/help is needed. This added assistance also requires more classrooms to house these students in smaller classes. The facilities may have to be clustered with primary labs in the center of primary classrooms and intermediate labs in the center of intermediate classroom areas.

E. Other:

How probable is the above selected characteristic of becoming widespread?

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

(20) As an expert in your field, you have additional knowledge and perceptions about education in the future. Please list any educational futures which you feel I have missed, and complete the information concerning probability, time line, and impact on school facilities.

Prediction #1:
Within five years the number of handicapped children will increase considerably.

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Because we will have more handicapped students and students in wheel chairs, one story buildings will be necessary or current buildings with more than one story will need elevators.

B. Other

How probable is the above selected characteristic of becoming widespread?

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Prediction #2:
Gifted and talented needs will be addressed more adequately.

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Provisions need to be made/allowed for students to do independent study. This will require space, computers, media resources, etc.

B. Other:

How probable is the above selected characteristic of becoming widespread?

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Prediction #3:
Shared learning/staff between districts and within district boundaries.

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Larger learning areas for involved schools.

B. Other____

How probable is the above selected characteristic of becoming widespread?

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Prediction #4:
More playground space will be demanded to increase outdoor activities instead of air-conditioning facility.

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Other____

How probable is the above selected characteristic of becoming widespread?

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Prediction #5:
Landscaping will be done inside of the facility as a means for students to appreciate nature.

Based upon this future prediction, what characteristics (educational specifications) must the school facilities of the future have in order to optimally house the educational program?

A. Other____

How probable is the above selected characteristic of becoming widespread?

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

The above architectural characteristic will become widely accepted in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Your assistance in this endeavor has been greatly appreciated. Thank you.

Appendix D

Round One Request to Participate

Round One Response Sheet

Round One Survey Instrument

October 1, 1992

Name
Organization
Street
City, State, Zip Code

Dear Name:

In many of the elementary and secondary schools across this nation, school boards and administrators are wrestling with a perplexing problem, how to educate students in facilities that are structurally sound but that are quickly becoming inadequate to house the educational programs of today's changed curriculum. School facilities designed and constructed only twenty years ago were adequate to house then existing enrollments, but changes in school offerings such as education for the handicapped, disadvantaged, gifted, and computer technology, have precipitated the remodeling and overcrowding of today's school buildings.

American architect Louis Sullivan once stated, that "form ever follows function," a principle that asserts that the design of a building must logically be based upon the activity housed within it. In the case of school facilities, the form of the school building is static throughout the forty to ninety year lifespan of the building, however, the function of education often changes dramatically during this same time period. Due to evolving school programs and services, the lengthy lifespan of the typical school building, and the substantial fiscal commitment required from the community for remodeling or new construction, school structures must be designed with future function and form in mind.

In an effort to generate a clearer picture of future educational programs and thus a better perception of future school facility architecture, I have developed a Delphi study involving this nation's reputationally elite futurists, architects and educators. The Delphi study was chosen as the appropriate research methodology for this investigation because it permits experts from different disciplines and locations to interact anonymously on a problem without face-to-face interaction. In a recent series of questionnaires to journal editors, your name was nominated repeatedly as a professional with expertise and interest in educational, social, technological, or architectural futures. Based upon this reputational nomination, I am asking for your participation in my study.

This Delphi study is two-part and involves a series of five iterative questionnaires, with feedback after each questionnaire. Due to the comprehensive nature of this study, I am asking for your participation in only the first two rounds of questionnaires (Part A of the study). The purpose of these two questionnaires is to generate consensus as to the impact of the social and technological future on K-12 educational programs. The second half (Part B of the study), a series of three questionnaires, will examine the impact of these educational programs on future educational architecture. The second half of the study will involve a different but similar reputational sample group. Selection to Part A or Part B of the study was random.

The first questionnaire gives a series of predictions on educational futures and asks you to rate each prediction as to the probability of occurrence and years to widespread acceptance. Each participant will be given the opportunity to add predictions to the questionnaire. In the second questionnaire, you will be given group feedback (mean and frequency distribution) from the first questionnaire along with any new predictions generated by the first round questionnaire. Taking into consideration the statistical feedback and any new predictions, you will be asked to re-respond to the questionnaire. Returning the second questionnaire would complete your obligation to the study.

I hope you will join me in this study by returning the enclosed white response sheet prior to October 30th. The first questionnaires will be mailed out on November 1st, with the second round of questionnaires targeted for December 1st. Your creativity, expertise and vision could greatly enhance the success of this study, therefore, your participation is very important and would be greatly appreciated.

Sincerely,

Kelvin L. McMillin

Enc.

Name
Organization
Street
City, State, Zip Code

Dear Name:

As a member of a reputationally elite group, I am asking for your participation in a research study of the social and technological future of K-12 education. Your obligation to this study would be to complete two iterative questionnaires on the probability of predicted educational futures occurring.

The questionnaires will be distributed on November 1st and December 1st, and will include qualitative and quantitative data from the first survey as feedback prior to answering the second survey. Care has been taken to ensure the anonymity of each respondent. The only personal information recorded will be summative and involve the primary occupation of the respondents.

Your creativity, expertise and vision could greatly enhance the success of this study, therefore, your participation would be greatly appreciated. Please return this response sheet prior to October 30, 1992. I thank you for your time and consideration in this matter.

Sincerely,

Kelvin L. McMillin

☐ Yes, I will participate in this study of the social and technological future of education.

☐ No, I will not participate in this study of the social and technological future of education.

Social and Technological Futures for Education

Round One

New Franklin R-1 School District

"A Recognized School of Excellence"
United States Department of Education

November 1992

November 1, 1992

Dear Colleague:

In many of the elementary and secondary schools across this nation, school boards and administrators are wrestling with a perplexing problem, how to educate students in facilities that are structurally sound but that are quickly becoming inadequate to house the educational programs of today's changed curriculum. School facilities designed and constructed only twenty years ago were adequate to house then existing enrollments, but changes in school offerings such as education for the handicapped, disadvantaged, gifted, and computer technology, have precipitated the remodeling and programmatic overcrowding of today's school facilities.

Due to the lengthy lifespan of the typical school building, the increasingly changing school curriculum and the substantial fiscal commitment required from the community for remodeling or new construction, school structures must be designed with the future of education in mind. Therefore, in order to design a school facility which will appropriately match future school offerings, architects, educators and futurists must first develop a clearer perception of the social, technological and educational needs of future school students.

The following pages represent a collection of social, technological and educational forecasts which may have an impact on future school programs. In order to develop the clearest perception of their accuracy, I am asking you to read each of these, consisting of a scenario and prediction, then rate each prediction as to the probability of occurrence and the number of years to widespread acceptance (if ever). A sample prediction from seventeen years ago has been included on the next page. Mean and frequency distribution of these ratings will be included as feedback for the second (final) round of this survey.

This collection of scenarios and predictions by no means represents the definitive list of social, technological or educational forecasts. Therefore, at the end of this survey is a section where you may make additions of new scenarios and predictions based upon your expertise and vision. These additional forecasts will be consolidated with new forecasts from other respondents and added to the second round of the survey for you to rate.

Your participation in this survey will be two dimensional. By adding forecasts you help to generate new ideas for the group, and by rating each prediction you assist in developing group consensus. The identity of all respondents will remain anonymous to the others.

I hope that you find this survey short, enjoyable and informative. Your participation, expertise and vision will greatly enhance its success. Please return this survey in the enclosed postage paid envelope by November 20, 1992.

Sincerely,

Kelvin L. McMillin

SAMPLE

Sample Scenario: Section 504 of the Rehabilitation Act of 1973.
No otherwise qualified handicapped individual in the United States . . . shall solely by reason of his handicap, be excluded from participation in, or be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance. . .

Education for All Handicapped Children Act of 1975.
States receiving federal financial assistance must identify handicapped children and provide a "free appropriate public education which emphasizes special education and related services designed to meet their unique needs."

Sample Prediction: The public schools of this nation will educate all children of their district, including those that are physically or mentally handicapped.

Probability of the above prediction becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #1: Social demand for education will increase while public expenditure for education will continue to be restricted. Government role will remain limited, but more federal funds may be spent in "matching" local efforts to finance educational innovations and research. Programs that enhance the basic curriculum may be financed through alternative means such as foundations.

Prediction #1: School districts will turn to private donations and foundations to supplement appropriations from local, state and federal governments. These funds will not be meant to replace government funds, but to enhance them.

Probability of the above prediction becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #2: The U.S. population will continue to grow older as the median age of the population continues to rise. The aging of the "baby boomers", and advances in health care, nutrition and life-style will result in an increase of the proportion of middle aged and older adults in the U.S. population (age 35 and older). These older, mature adults will look to their local schools for continued, personal education and as classroom volunteers.

Prediction #2: Public Schools of the future will be called upon to educate not only students from the traditional ages of 5-17, but also older, even retired, adults. This expanded "adult education" role may include weekend or evening programs.

Probability of the above prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #3: The U.S. population will increasingly be made up of minority groups. The U.S. population growth will become increasingly dependent upon legal and illegal immigration. Within a decade, one in every three students will come from a minority background. At some point in the future, the "majority" population will be made up of groups of "minorities". Today's majority white population will become tomorrow's minority.

Prediction #3: Future curriculum content will address the issue of diverse cultural values and languages. School personnel will utilize teaching strategies that stress appreciation, understanding and the value of other cultures.

Probability of the above prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #4: The growth of an urban, minority underclass is likely to occur as the birth rate among families with less than a $10,000 yearly income will double that of families with a $30,000 or more yearly income. Single parent households continue to be the fastest growing family unit, particularly households headed by male single parents. Immigration is now America's greatest source of population growth.

Prediction #4: A greater proportion of tomorrow's students will enter school with one or more "strikes" against them. These "strikes" may include poverty or lower family income, a single parent household, or a minority heritage with parents of a below-average educational level.

Probability of the above prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #5: The number of households in America continues to grow at a faster rate than does the population. The greatest growth in population is occurring in single income, single parent families making less than $10,000 per year. This growth is approaching twice that of double income families making $30,000 or more per year. As poorer families get larger, wealthier families get smaller. One result of this economic and birth inequality is that smaller, wealthier families will be more financially able to afford the newer technologies as they are developed
Prediction #5: Economic differences between double income families and single parent families will increase. One result of this economic inequality will be the development of technological haves and have nots in society.

Probability of the above prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #6: Social service agencies are becoming increasingly understaffed, under funded and over run by the size of the population requesting services. In an effort to streamline state expenditures and reduce duplicated services, some school districts are expanding their services to include health and minor medical care (particularly pre-natal), before and after school child care, early childhood day care programs, and extended counseling duties to include graduate job placement and counseling.

Prediction #6: School districts will become social service centers for their communities. Their services will include health and medical care, affordable day care, and job placement.

Probability of the above prediction becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #7: With the break up of the Soviet Union and the unification of Germany, the need for economic strength will far out weigh the need for military might. Moving into the next century, the world economy will be based around three major trading blocs and their trade, economic and diplomatic links. These trading blocs are: Japan and the Pacific Rim, the United States and a unified Europe. Two of the fastest developing industries in these blocs are information technology and biological engineering.

Prediction #7: Economic rather than military strength will determine tomorrow's superpowers, and global leadership in science and technology will determine economic strength.

Probability of the above prediction becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #8: As technology becomes more advanced and access to personalized information becomes easier to get, the role of the home may change. Some services which will become more home-based thorough technology are: banking, shopping, minor medical (through two-way video and electronic monitoring), education and work (where service sector workers will process information at home and transmit it electronically to the workplace).

Prediction #8: Information technology will blur the barrier between work, school and home, resulting in an indeterminate work/school day.

Probability of the above prediction becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #9: By the year 1995, U.S. schools are predicted to be short 700,000 qualified teachers, and by the year 2000 the number of new graduates in education is expected to satisfy only 60% of the new hire demand. By as early as 1995, most states are expected to implement alternative routes to teacher certification as one solution to these shortages, particularly in science.

Prediction #9: School districts will increasingly utilize business and industry trained professionals as classroom teachers.

Probability of the above prediction becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #10: The agrarian based society is gone. The industrial/manufacturing based society is declining. The prime resources of the future are information and knowledge. Advances in computer technology and micro electronics has led to an explosion in the information processing ability of companies and individuals. This information based economy will prize human intelligence as a major resource, information tailored to the individual as the primary output, and biotechnology as the primary science.

Prediction #10: The United States will continue to move from an industrial based economy to an information based economy where human intelligence, specialized information processing and biological engineering are the key components.

Probability of the above prediction becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #11: Within the next twenty years, many corporations are expected to trim their management hierarchies to half of their current levels. These corporations will be moving towards a more efficient management style of "networking", where lower level employees will operate more independently with increased decision-making responsibilities. Some operations previously handled "in- house" will be networked via technology to specialists outside or across the corporation. Small firms providing highly specialized services will fill in the gaps left by these restructured large firms.
Prediction #11: Through computer technology and networking, small companies will be able to compete successfully with large firms. Networks or management teams will replace management hierarchies in most corporations.

Probability of the above prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #12: Interactive distance learning, the live two-way interactive use of video technology, will expand the resources of many school systems to include teachers and classrooms of neighboring or far-away districts. Students in one classroom may see and hear teachers/classrooms from other districts and vice-versa. The sharing of resources (teachers) via two-way interactive television will expand the specialized and higher order course offerings of many school districts, particularly small or rural districts.

Prediction #12: Distance learning will be used more extensively to bring quality, comprehensive learning experiences to all students.

Probability of the above prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #13: In a recent Roper Organization poll, AIDS, crime and drug abuse were the issues listed about which Americans were the most concerned. One of these, drug abuse, has many educators worried. Children born to mothers who are drug users, particularly the drug "crack", are more likely to be born with physical impairments than are children of non-drug using mothers, and are several times more likely to be socially, emotionally or intellectually delayed. These children, which will often exhibit multiple disorders, will have special educational needs.

Prediction #13: The problems exhibited by children born to drug addicted mothers will cause educators to alter the approaches they utilize in educating children. New definitions for achievement may result and categories of special education may be expanded.

Probability of the above prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #14: In the future the organizational structure of schools will be called into question. Time-based promotion, age-graded classrooms and Carnegie units will be seen as a less efficient educational structure. The needs of individual students will be seen as more important than traditional grouping practices.

Prediction #14: In the future, promotion between grade levels and graduation will be based upon the individual mastery of educational concepts and not by age. Students will be expected to exhibit mastery of pre-specified outcomes prior to promotion or graduation.

Probability of the above prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #15: Dissatisfaction with the quality of education obtained in the traditional neighborhood school, has led many parents to pursue alternative means of educating their children.

Prediction #15: There will be a rise in the percentage of students enrolled in alternative schooling programs. These programs will include year-round classrooms, magnet schools in the arts and sciences, home schooling, and the use of the voucher system (which will allow any student the opportunity to attend the school of their choice, public or private).

Probability of the above prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #16: With the break up of the Soviet Union and the unification of Germany, the need for economic strength will far out weigh the need for military might. Moving into the next century, the world economy will be based around three major trading blocs and their trade, economic and diplomatic links. These trading blocs are: Japan and the pacific Rim, the United States and a unified Europe. U.S. exports to Europe and the Pacific Rim will become critical to the economic health of the United States.

Prediction #16: There will be a continued movement toward a globalization of economic markets, communications and finance with an increased foreign ownership of U.S. industries and increased U.S. exports to foreign countries.

Probability of the above prediction becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #17: Advancements in computer hardware and software have made the educational use of computers more viable. Software developers have made significant progress in diagnosing individual student educational needs, matching appropriate educational instruction to these needs and tracking student progress.

Prediction #17: Computer technology will become an integral part in the diagnosis of student needs, the development of prescriptive instruction, and the monitoring of student progress.

Probability of the above prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #18: There is a growing mismatch between the literacy level (vocabulary, reading and writing skills) of high school graduates and the competencies required by the jobs available. By the year 2000, three-fourths of new work force entrants will be qualified for only 40% of the jobs available. As a result, many industries are asking schools to produce graduates that can not only read and write but also have competencies in problem solving, communications and computers.

Prediction #18: Businesses will increasingly demand greater technical skills of high school graduates in problem solving, communications and computer literacy.

Probability of the above prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #19: Large scale employers are increasingly seeing the need to teach remedial and/or specialized occupational skills to their employees. U.S. employers spend $210 billion annually on training of the national work force, an increase of over 70% between 1985 and 1988. Also rising is the number of companies sponsoring English educational programs to immigrant workers. By the year 2000, it is predicted that immigrants will fill more than one-fifth of all new jobs in the United States.

Prediction #19: Over half of all large companies (10,000+ workers) will offer some means of formal or informal education for their employees by the year 2000.

Probability of the above prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #20: Social and environmental issues are increasingly becoming public concerns. Issues such as drugs, AIDS, the "greenhouse effect", and destruction of the rainforest are becoming a focus of national and international policy.

Prediction #20: There will be an increase in public attention to social and environmental issues.

Probability of the above prediction becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

As an expert in your field, you have additional knowledge and perceptions about the future. Please list any social, technological or educational futures which you feel have been omitted, and complete the information concerning probability and years to widespread use.

New Scenario #1: ____________________

New Prediction #1: ____________________

Probability of the above prediction becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

New Scenario #2:

New Prediction #2:

Probability of the above prediction becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

New Scenario #3:____

New Prediction #3:____

Probability of the above prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

New Scenario #4:

New Prediction #4:

Probability of the above prediction becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

New Scenario #5: ______________________________

New Prediction #5: ______________________________

Probability of the above prediction becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please return this survey by

November 20, 1992.

Your participation, vision and expertise has greatly enhanced its success.

Thank you.

Appendix E

Round Two Survey Instrument

Round One Survey Results

Social and Technological Futures for Education

Final Round

New Franklin R-1 School District

"A Recognized School of Excellence"
United States Department of Education

December 1992

December 1, 1992

Dear Colleague:

I would like to thank you for your generous participation in the first round survey on social and technological futures for education. The results of this first round have been included in this, the second (and final), round of the survey.

You may note that this survey is rather lengthy, twenty original forecasts and twenty-four new forecasts. The number of new forecasts from the participants (thirty-two) far exceeded the expectation. Therefore, I have attempted to reduce the number of forecasts by combining those of similar meaning. In combining forecasts, I have tried to "honor the original intent" of the author. I hope I have been successful.

In those new forecasts which were not combined, I have tried to use the original words of the authors. Changes were made only when the addition of a word or two helped to clarify or make a forecast more readable. The original words of the authors were used to preserve the uniqueness of each forecast.

I have made three minor changes in this survey. The first was to change the term "prediction" (as in Prediction #1) to a more accurate term, "forecast". The second change was in forecast #19, where the words "by the year 2000" have been changed to "in the future". The third change involves forecast #15, where the use of the voucher system has been removed and placed by itself in a later scenario. I hope these changes will make the survey more clear for you.

Many of you wrote notes in the borders or bottom of your responses. I would like to thank you for these additions. These notes will make valuable additions to this research as all responses will be analyzed using both quantitative and qualitative measures.

On each of the following pages you will see the same format. The top of each page lists a scenario and a forecast. The middle portion of each page gives first round feedback on that forecast using frequency distribution and mean. In the lower section of each page I ask for you to please re-respond to the forecast giving probability and years to widespread use.

I hope you will find this survey enjoyable and informative. The addition of new forecasts to the survey has helped in the identification of possible futures effecting education. Your response to each of these forecasts will help to generate consensus as to their probability. As always, your participation, expertise and vision has greatly enhanced the success of this project. Please return this survey in the enclosed postage paid envelope by December 30, 1992.

Sincerely,

Kelvin L. McMillin

Scenario #1: Social demand for education will increase while public expenditure for education will continue to be restricted. Government role will remain limited, but more federal funds may be spent in "matching" local efforts to finance educational innovations and research. Programs that enhance the basic curriculum may be financed through alternative means such as foundations.

Forecast #1: School districts will turn to private donations and foundations to supplement appropriations from local, state and federal governments. These funds will not be meant to replace government funds, but to enhance them.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

8 Highly probable. Will unquestionably occur.
7 Probable. A strong possibility that it will occur.
3 Somewhat probable. A weak possibility that it will occur.
1 Somewhat improbable. A weak possibility that it will not occur.
1 Improbable. A strong possibility that it will not occur.
___ Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 5.6 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	4	8	6	☐	☐	☐	☐	☐	☐	☐	☐	2

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #2: The U.S. population will continue to grow older as the median age of the population continues to rise. The aging of the "baby boomers", and advances in health care, nutrition and life-style will result in an increase of the proportion of middle aged and older adults in the U.S. population (age 35 and older). These older, mature adults will look to their local schools for continued, personal education and as classroom volunteers.

Forecast #2: Public Schools of the future will be called upon to educate not only students from the traditional ages of 5-17, but also older, even retired, adults. This expanded "adult education" role may include weekend or evening programs.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

8___Highly probable. Will unquestionably occur.
10__Probable. A strong possibility that it will occur.
2___Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 6.3 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	5	7	6	2	☐	☐	☐	☐	☐	☐	☐	☐

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #3: The U.S. population will increasingly reflect minority groups. The U.S. population growth will become increasingly dependent upon legal and illegal immigration. Within a decade, one in every three students will come from a minority background. At some point in the future, the "majority" population will consist of groups of "minorities". Today's majority white population will become tomorrow's minority.

Forecast #3: Future curriculum content will address the issue of diverse cultural values and languages. School personnel will utilize teaching strategies that stress appreciation, understanding and the value of other cultures.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

11___Highly probable. Will unquestionably occur.
6___Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 6.6 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	3	7	7	1	☐	☐	☐	☐	☐	☐	☐	☐

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #4: The growth of an urban, minority underclass is likely to occur as the birth rate among families with less than a $10,000 yearly income will double that of families with a $30,000 or more yearly income. Single parent households continue to be the fastest growing family unit, particularly households headed by male single parents. Immigration is now America's greatest source of population growth.

Forecast #4: A greater proportion of tomorrow's students will enter school with one or more "strikes" against them. These "strikes" may include poverty or lower family income, a single parent household, or a minority heritage with parents of a below-average educational level.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

14____Highly probable. Will unquestionably occur.
4____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
1____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 3.3 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	**9**	**6**	**3**	☐	☐	☐	☐	☐	☐	☐	☐	**1**

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #5: The number of households in America continues to grow at a faster rate than does the population. The greatest growth in population is occurring in single income, single parent families making less than $10,000 per year. This growth is approaching twice that of double income families making $30,000 or more per year. As poorer families get larger, wealthier families get smaller. One result of this economic and birth inequality is that smaller, wealthier families will be more financially able to afford the newer technologies as they are developed

Forecast #5: Economic differences between double income families and single parent families will increase. One result of this economic inequality will be the development of technological haves and have nots in society.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

8____Highly probable. Will unquestionably occur.
9____Probable. A strong possibility that it will occur.
2____Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 4.7 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	7	6	6	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #6: Social service agencies are becoming increasingly understaffed, under funded and over run by the size of the population requesting services. In an effort to streamline state expenditures and reduce duplicated services, some school districts are expanding their services to include health and minor medical care (particularly pre-natal), before and after school child care, early childhood day care programs, and extended counseling duties to include job placement and adult counseling.

Forecast #6: School districts will become social service centers for their communities. Their services will include health and medical care, affordable day care and job placement.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

4___Highly probable. Will unquestionably occur.
11___Probable. A strong possibility that it will occur.
3___Somewhat probable. A weak possibility that it will occur.
1___Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 9.4 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	4	9	2	1	☐	☐	☐	☐	☐	☐	1

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #7: With the break up of the Soviet Union and the unification of Germany, the need for economic strength will far out weigh the need for military might. Moving into the next century, the world economy will be based around three major trading blocs and their trade, economic and diplomatic links. These trading blocs are Japan and the Pacific Rim, the United States and a unified Europe. Two of the fastest developing industries in these blocs are information technology and biological engineering.

Forecast #7: Economic rather than military strength will determine tomorrow's superpowers, and global leadership in science and technology will determine economic strength.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

10___Highly probable. Will unquestionably occur.
8____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 5.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	6	7	4	1	☐	☐	☐	☐	☐	☐	☐	☐

Please rerate the probability of the above forecast becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #8: As technology becomes more advanced and access to personalized information becomes easier to get, the role of the home may change. Some services which will become more home-based thorough technology are banking, shopping, minor medical (through two-way video and electronic monitoring), education and work (where service sector workers will process information at home and transmit it electronically to the workplace).

Forecast #8: Information technology will blur the barrier between work, school and home, resulting in an indeterminate work/school day.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

7____Highly probable. Will unquestionably occur.
8____Probable. A strong possibility that it will occur.
3____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.6 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	4	10	2	2	☐	☐	☐	☐	☐	☐	☐

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #9: By the year 1995, U.S. schools are predicted to be short 700,000 qualified teachers, and by the year 2000 the number of new graduates in education is expected to satisfy only 60% of the new hire demand. By as early as 1995, most states are expected to implement alternative routes to teacher certification as one solution to these shortages, particularly in science.

Forecast #9: School districts will increasingly utilize business and industry trained professionals as classroom teachers.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

2 Highly probable. Will unquestionably occur.
13 Probable. A strong possibility that it will occur.
4 Somewhat probable. A weak possibility that it will occur.
1 Somewhat improbable. A weak possibility that it will not occur.
____ Improbable. A strong possibility that it will not occur.
____ Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 7.5 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	9	9	1	☐	☐	☐	☐	☐	☐	☐	☐

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #10: The agrarian based society is gone. The industrial/manufacturing based society is declining. The prime resources of the future are information and knowledge. Advances in computer technology and micro electronics has led to an explosion in the data processing ability of companies and individuals. This information based economy will prize human intelligence as a major resource, data tailored to the individual as the primary output, and biotechnology as the primary science.

Forecast #10: The United States will continue to move from an industrial based economy to an information based economy where human intelligence, specialized data processing and biological engineering are the key components.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

9___Highly probable. Will unquestionably occur.
9___Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	7	7	2	1	☐	☐	1	☐	☐	☐	☐

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #11: Within the next twenty years, many corporations are expected to trim their management hierarchies to half of their current levels. These corporations will be moving towards a more efficient management style of "networking", where lower level employees will operate more independently with increased decision-making responsibilities. Some operations previously handled "in- house" will be networked via technology to specialists outside or across the corporation. Small firms providing highly specialized services will fill in the gaps left by these restructured large firms.

Forecast #11: Through computer technology and networking, small companies will be able to compete successfully with large firms. Networks or management teams will replace management hierarchies in most corporations.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

2___Highly probable. Will unquestionably occur.
15__ Probable. A strong possibility that it will occur.
2___Somewhat probable. A weak possibility that it will occur.
1___Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 10.3 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	3	12	2	2	☐	☐	☐	☐	☐	☐	☐

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #12: Interactive distance learning, the live two-way interactive use of video technology, will expand the resources of many school systems to include teachers and classrooms of neighboring or far-away districts. Students in one classroom may see and hear teachers/classrooms from other districts and vice-versa. The sharing of resources (teachers) via two-way interactive television will expand the specialized and higher order course offerings of many school districts, particularly small or rural districts.

Forecast #12: Distance learning will be used extensively to bring quality, comprehensive learning experiences to all students.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

10 Highly probable. Will unquestionably occur.
10 Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 7.8 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	3	6	8	3	☐	☐	☐	☐	☐	☐	☐	☐

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #13: In a recent Roper Organization poll, AIDS, crime and drug abuse were the issues listed about which Americans were the most concerned. One of these, drug abuse, has many educators worried. Children born to mothers who are drug users, particularly the drug "crack", are more likely to be born with physical impairments than are children of non-drug using mothers, and are several times more likely to be socially, emotionally or intellectually delayed. These children, who will often exhibit multiple disorders, will have special educational needs.

Forecast #13: The problems exhibited by children born to drug addicted mothers will cause educators to alter the approaches they utilize in educating children. New definitions for achievement may result and categories of special education may be expanded.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

7___Highly probable. Will unquestionably occur.
7___Probable. A strong possibility that it will occur.
5___Somewhat probable. A weak possibility that it will occur.
1___Somewhat improbable. A weak possibility that it will not occur.
___Improbable. A strong possibility that it will not occur.
___Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 6.6 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	2	9	8	☐	☐	☐	☐	☐	☐	☐	☐	1

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #14: In the future the organizational structure of schools will be called into question. Time-based promotion, age-graded classrooms and Carnegie units will be considered a less efficient educational structure. The needs of individual students will be seen as more important than traditional grouping practices.

Forecast #14: In the future, promotion between grade levels and graduation will be based upon the individual mastery of educational concepts and not by age. Students will be expected to exhibit mastery of pre-specified outcomes prior to promotion or graduation.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

5__Highly probable. Will unquestionably occur.
8__Probable. A strong possibility that it will occur.
5__Somewhat probable. A weak possibility that it will occur.
1__Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	5	11	1	2	☐	☐	☐	☐	☐	☐	☐

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #15: Dissatisfaction with the quality of education obtained in the traditional neighborhood school, has led many parents to pursue alternative means of educating their children.

Forecast #15: There will be a rise in the percentage of students enrolled in alternative schooling programs. These programs will include year-round classrooms, magnet schools in the arts and sciences and the use of home schooling.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

5__Highly probable. Will unquestionably occur.
8__Probable. A strong possibility that it will occur.
3__Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 7.5 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	**2**	**6**	**6**	**2**	☐	☐	☐	☐	☐	☐	☐	☐

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #16: With the break up of the Soviet Union and the unification of Germany, the need for economic strength will far out weigh the need for military might. Moving into the next century, the world economy will be based around three major trading blocs and their trade, economic and diplomatic links. These trading blocs are: Japan and the pacific Rim, the United States and a unified Europe. U.S. exports to Europe and the Pacific Rim will become critical to the economic health of the United States.

Forecast #16: There will be a continued movement toward a globalization of economic markets, communications and finance with an increased foreign ownership of U.S. industries and increased U.S. exports to foreign countries.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

11___Highly probable. Will unquestionably occur.
4___Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 7.5 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	7	7	1	☐	☐	☐	☐	☐	☐	☐	☐

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #17: Advancements in computer hardware and software have made the educational use of computers more viable. Software developers have made significant progress in diagnosing individual student educational needs, matching appropriate educational instruction to these needs and tracking student progress.

Forecast #17: Computer technology will become an integral part in the diagnosis of student needs, the development of prescriptive instruction, and the monitoring of student progress.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

12___Highly probable. Will unquestionably occur.
8___Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 8.5 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	7	9	3	☐	☐	☐	☐	☐	☐	☐	☐

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #18: There is a growing mismatch between the literacy level (vocabulary, reading and writing skills) of high school graduates and the competencies required by the jobs available. By the year 2000, three-fourths of new work force entrants will be qualified for only 40% of the jobs available. As a result, many industries are asking schools to produce graduates who can not only read and write but also have competencies in problem solving, communications and computers.

Forecast #18: Businesses will increasingly demand greater skills of high school graduates in problem solving, communications and computer literacy.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

13___Highly probable. Will unquestionably occur.
7___Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 6.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	5	6	9	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #19: Large scale employers are increasingly seeing the need to teach remedial and/or specialized occupational skills to their employees. U.S. employers spend $210 billion annually on training of the national work force, an increase of over 70% between 1985 and 1988. Also rising is the number of companies sponsoring English educational programs to immigrant workers. In the near future, it is predicted that immigrants will fill more than one-fifth of all new jobs in the United States.

Forecast #19: Over half of all large companies (10,000+ workers) will offer some means of formal or informal education for their employees in the future.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

12___Highly probable. Will unquestionably occur.
5___Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 7.8 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	4	2	10	2	☐	☐	☐	☐	☐	☐	☐	☐

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #20: Social and environmental issues are increasingly becoming public concerns. Issues such as drugs, AIDS, the "greenhouse effect", and the destruction of the rainforest are becoming a focus of national and international policy.

Forecast #20: There will be an increase in public attention to social and environmental issues.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

14___Highly probable. Will unquestionably occur.
6___Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 4.8 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	6	9	5	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please rerate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #21 (New): Information technology will allow people to have virtual experiences in which they can "go" somewhere and touch, see, hear and possibly smell things as though they were there. They will do this without going anywhere. Virtual reality will inspire students and improve learning.

Forecast #21 (New): "Virtual reality" will become a tool for teaching, particularly geography, history, science and someday math.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_2___Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 12.5 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	1	1	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #22 (New): Increasing numbers of states are facing crises with respect to funding public education. Several states' funding formulas have been determined unconstitutional or are under pressure due to tax caps and/or concerns about inequality. Continually increasing costs of education combined with a shift in population demographics (aging, increased percentage of minorities, etc.) will force changes in how public education is funded.

Forecast #22 (New): Inequities in funding of public schools will receive increasing levels of public attention resulting in court ordered restructuring of educational finances. This may include a shift from local to state (from private property tax formulas to sales or income tax formulas).

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
__2__Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 7.5 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	1	1	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #23 (New): Support for education reform and options will grow. The use of the voucher system will allow any student the opportunity to attend the school of their choice, public or private.

Forecast #23 (New): Students will be given vouchers to purchase their education from many sources, public or private.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

1___Highly probable. Will unquestionably occur.
1___Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 5.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #24 (New): Computer networks are by-passing traditional media channels - i.e. bringing the real info to the world from the Chinese student rebellion and from the former Soviet Union. These networks will become more widely used and have a major effect on politics, ecology, environment, economy, etc.

Forecast #24 (New): A more efficient kind of internet will be developed that can be accessed and used easily from any site.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

1____Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 5.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #25 (New): Information and communication technology at the global scale and differences in time zones will make global communication an around the clock around the globe affair. We will be able to, and need to, reach-out from our homes to the world.

Forecast #25 (New): Just as the office at home is already a reality, the classroom at home will be a supplement to formal school classrooms. The media room at home will be the growth center for adults and children alike.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
1___Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 15.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #26 (New): Volunteering will become increasingly important in society as the population grows, money shrinks and the need for support of social service agencies increases.

Forecast #26 (New): Volunteering, off-campus programs, learning in the community, helping others, tutoring, working/studying in social agencies and hospitals, et. al. will dramatically increase in the coming years.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

1____Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #27 (New): Recognition that environment (school buildings) affects learning is growing rapidly. New advances in technology/information retrieval is changing the design of learning spaces. Teaching methodology in all curriculum areas is being dramatically changed through the use of new technology.

Forecast #27 (New): The relationship between learning, technology and physical facilities will play a major role in restructuring education and the planning of new schools.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

1____Highly probable. Will unquestionably occur.
1____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	2	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #28 (New): Group paced instruction, required courses for all, inflexible schools, mandatory attendance, ABCDF report cards, one set of regulations for all, tracking, ability grouping, GATE/Special Education segregations, et al. have been the forces of existence preventing learning from replacing schooling and therefore must be eliminated.

Forecast #28 (New): Traditional schedules, mandated report cards, required classes for all, segregated learning as in "at risk" attendance programs and other indefensible trappings of schooling will be eliminated as part of the transformation to a new society and learning will truly be more individualized and personalized.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
1____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 15.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #29 (New): The greatest need for workers in the next twenty years (in terms of numbers) is not in technological industries but as custodians, restaurant workers, garbage collectors- those not requiring a high school diploma, thus focusing education on appropriate programs for non-college, non-technical graduates.

Forecast #29 (New): Schools will change their focus from beating the Japanese, high test scores and core curriculum, and begin to plan more appropriate and meaningful- but not segregated- programs for those who will work in restaurants and other non-technical, non-college jobs.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
1____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #30 (New): Non educational responsibilities- social issues such as AIDS education, distribution of condoms, child care, will continue to be placed upon the public schools. These responsibilities take time away from curricular activities.

Forecast #30 (New): As a result of the increase in non-educational responsibilities on the part of the public schools (AIDS education, distribution of condoms, child care, etc.) private schools will increase in enrollment- up to one third of the national school age population.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
__1__Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #31 (New): Commercial firms dealing with technology have produced sophisticated educational programs such as IBM Writing to Read and their math program. These have been very successful in the public schools.

Forecast #31 (New): IBM and Apple merge in an effort to open private schools where students are taught all subjects using CAI (Computer Assisted Instruction) methodology. These schools for profit will come into existence in the near future.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses
_____Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
1____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #32 (New): There is increasing democracy in all institutions and countries including reduction of totalitarianism and business participatory management.

Forecast #32 (New): Schools will increasingly give major decision powers to stakeholders (parents, teachers, students), including giving much greater decision power to students to set goals and decide their program.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
__2__Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 5.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #33 (New): Since 1983, school districts, legislative and federal groups have played with the educational system with little or no results. The latest effort to find out "what" and "how" to fix the system (New American School Development Corporation) which will not work because the design is to create new models and replace what works. This will take forever- business would never try this approach.

Forecast #33 (New): Change will come at the local level through the application of a processes approach (TQM is an example) that focuses on the customer's needs, results and customer satisfaction. Applying sound methodology for change which focuses on attaining positive results for students will drive the education system.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

_1___Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #34 (New): Economic forces continue to provide the impetus for the design/ development of highly interactive and well designed educational software. The software will be available to, and purchased by, educators as well as the general public (perhaps through interactive on-line services.

Forecast #34 (New): Continually increasing use of powerful information technologies in formal schooling (as well as in more informal settings) will force the redefinition of the roles of building administrators, teachers and learners.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
_1___Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 15.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #35 (New): Expert systems will increasingly aid all kinds of workers- making them more effective and productive. Teachers are no exception, expert systems will allow them access to greater information, help tailor lessons, track students, design exams. They will be used with PC tutors.

Forecast #35 (New): Teachers will double or triple the number of students they can manage at one time with expert systems and coordinated use of PC-based tutoring programs.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

____Highly probable. Will unquestionably occur.
_1_Probable. A strong possibility that it will occur.
____Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #36 (New): The Proposed Minnesota Experimental City was planned for 250,000 people with NO schools. The city was the living learning laboratory. Everyone was a teacher, everyone a learner. The New Generation American School Corporation grants have given the eleven grantees the licence to do similar experiments. One day there will be a community without schools.

Forecast #36 (New): Schooling cannot continue to exist, but must transition to education and finally to learning in a transformed society where there will be no 9:00-3:00, K-12 schools as exist in 1992.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
1____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 30.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	☐	☐	☐	☐	1	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #37 (New): Educators are increasingly finding it necessary to bring in social agencies of the community to help them solve problems of students. The need for close cooperation between the school and such agencies as the welfare office, social security office, juvenile court, state/county employment offices and other offices has become very evident to educators.

Forecast #37 (New): New elementary schools will be planned and designed as community schools. Existing schools will be expanded to include the community school concept where social agencies are physically located in the school and work closely with school personnel.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_1___Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 0.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #38 (New): Society has begun to acknowledge learning as a 24 hour, year long, and hopefully life long activity. Learning need not end during the summer or while on vacation. Recognizing the need for a different kind of school, parents are schooling children themselves, corporations are training workers in-house and people of all ages are learning through technology at home. Each of these needs could be met locally and cost effectively at one site.

Forecast #38 (New): Community learning centers (or learning access centers), created around a multi-media technology center, will be open year-round and around-the-clock to serve learners of all ages. These centers would also be available to tourists on vacation.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

1___Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	1	☐	1	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #39 (New): Formal study in school greatly reduced to K to average age of 11 or 12. Older students 1/3 work, 1/3 independent study with computer assistance, 1/3 age group studies and activities. Many high schools will be long closed, instead there will be neighborhood centers with multiple uses.

Forecast #39 (New): Teacher role, function preparation, radical change in new roles include tutor, day care expert, consulting expert, coach developmental psychologist, planner, arranger, etc.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
__1__Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 25.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	☐	☐	☐	1	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #40 (New): The fact that we are running out of air space for television channels means that as they multiply, they will have to be transmitted through underground wiring, while telephones will be transmitted through air space. The new administration will promote this change through legislation that will effect telephone companies and make it cost effective to run underground fiber.

Forecast #40 (New): Fiber optic networks will link homes throughout the U.S. to business, educational institutions and services, banks, etc.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_1__Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 5.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #41 (New): If the human potential is truly the capital of the future then we should all pay into a life-long learning fund. The fund provides every individual with learning stock which we can use to pay for education, books, videos, special symposia, discovery vacations or certification programs. Every citizen has a life long learning N^{O} (L^{4}). It is an account started at birth and ends with death.

Forecast #41 (New): We will have learning credit accounts used to pay for any educational/learning certified program or activity.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
_1___Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 20.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	☐	☐	1	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #42 (New): Consortium of computer companies decides to put PCs in front of every school child. This initiates a greatly increased use of computers in school. New discoveries about learning result and networks expand.

Forecast #42 (New): Learning (computer based) becomes a national (and global) network-based process. Cross boundary fertilization of education and educational ideas, i.e. U.S.-Japan interchange.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
1____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 30.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	☐	☐	☐	☐	1	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #43 (New): Buckminster Fuller stated the only thing that really counts in the curriculum is air, water and food- for we can only live 5 minutes without air, 5 days without water and 5 weeks without food. Reading, math, traditional subjects- even nuclear weapons- pale until we can guarantee for all the environmental essentials.

Forecast #43 (New): Traditional requirements will give way to really important, crucial studies, such as the 64 global dilemmas, which are really one, one-macroproblem- how to become the way to a preferable future for humankind.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
__1__Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 15.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:
The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #44 (New): Given the complexity of events facing school leaders, training programs from professional organizations and institutions of higher education professional schools will increase their use of cohorting students.

Forecast #44 (New): The professional schools will continue to develop their students into "team" group cohesive decision makers.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
_1___Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 5.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Having read the enclosed scenarios and forecasts, you may have additional forecasts which you would like to add. Please list any social, technological or educational futures which you feel have been omitted, and complete the information concerning probability and years to widespread use.

New Scenario:

New Forecast:

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

New Scenario: ____________________

New Forecast: ____________________

Please rate the probability of the above forecast becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please return this survey by December 30, 1992. Your participation, vision and expertise has greatly enhanced its success. Thank you.

Appendix F

Round One Survey Results

Round Two Survey Results

Social and Technological Futures for Education

Round One and Two Responses

New Franklin R-1 School District

"A Recognized School of Excellence"
United States Department of Education

Scenario #1: Social demand for education will increase while public expenditure for education will continue to be restricted. Government role will remain limited, but more federal funds may be spent in "matching" local efforts to finance educational innovations and research. Programs that enhance the basic curriculum may be financed through alternative means such as foundations.

Forecast #1: School districts will turn to private donations and foundations to supplement appropriations from local, state and federal governments. These funds will not be meant to replace government funds, but to enhance them.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

8___Highly probable. Will unquestionably occur.
7___Probable. A strong possibility that it will occur.
3___Somewhat probable. A weak possibility that it will occur.
1___Somewhat improbable. A weak possibility that it will not occur.
1___Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 5.6 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	4	8	6	☐	☐	☐	☐	☐	☐	☐	☐	2

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

10___Highly probable. Will unquestionably occur.
7___Probable. A strong possibility that it will occur.
3___Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 5.50 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	7	6	5	2	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #2: The U.S. population will continue to grow older as the median age of the population continues to rise. The aging of the "baby boomers", and advances in health care, nutrition and lifestyle will result in an increase of the proportion of middle aged and older adults in the U.S. population (age 35 and older). These older, mature adults will look to their local schools for continued, personal education and as classroom volunteers.

Forecast #2: Public Schools of the future will be called upon to educate not only students from the traditional ages of 5-17, but also older, even retired, adults. This expanded "adult education" role may include weekend or evening programs.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

8___Highly probable. Will unquestionably occur.
10___Probable. A strong possibility that it will occur.
2___Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 6.3 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	5	7	6	2	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

11___Highly probable. Will unquestionably occur.
8___Probable. A strong possibility that it will occur.
____Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
1___Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 5.26 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	3	13	2	1	☐	☐	☐	☐	☐	☐	☐	1

Scenario #3: The U.S. population will increasingly reflect minority groups. The U.S. population growth will become increasingly dependent upon legal and illegal immigration. Within a decade, one in every three students will come from a minority background. At some point in the future, the "majority" population will consist of groups of "minorities". Today's majority white population will become tomorrow's minority.

Forecast #3: Future curriculum content will address the issue of diverse cultural values and languages. School personel will utilize teaching strategies that stress appreciation, understanding and the value of other cultures.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

11___Highly probable. Will unquestionably occur.
6___Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 6.6 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	3	7	7	1	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:

Frequency Distribution of Round Two Responses

18___Highly probable. Will unquestionably occur.
2___Probable. A strong possibility that it will occur.
____Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 5.00 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	7	6	7	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #4: The growth of an urban, minority underclass is likely to occur as the birth rate among families with less than a $10,000 yearly income will double that of families with a $30,000 or more yearly income. Single parent households continue to be the fastest growing family unit, particularly households headed by male single parents. Immigration is now America's greatest source of population growth.

Forecast #4: A greater proportion of tomorrow's students will enter school with one or more "strikes" against them.. These "strikes" may include poverty or lower family income, a single parent household, or a minority heritage with parents of a below-average educational level.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

14____Highly probable. Will unquestionably occur.
4____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
1____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 3.3 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	9	6	3	☐	☐	☐	☐	☐	☐	☐	☐	1

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

19____Highly probable. Will unquestionably occur.
1____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 1.25 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	15	5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #5: The number of households in America continues to grow at a faster rate than does the population. The greatest growth in population is occuring in single income, single parent families making less than $10,000 per year., This growth is approaching twice that of double income families making $30,000 or more per year. As poorer familes get larger, wealthier families get smaller. One result of this economic and birth inequality is that smaller, wealthier families will be more financially able to afford the newer technologies as they are developed

Forecast #5: Economic differences between double income families and single parent families will increase. One result of this economic inequality will be the development of technological haves and have nots in society.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

8___Highly probable. Will unquestionably occur.
9___Probable. A strong possibility that it will occur.
2___Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 4.7 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	7	6	6	☐	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:

Frequency Distribution of Round Two Responses

12__Highly probable. Will unquestionably occur.
7___Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 4.00 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	9	7	3	1	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #6: Social service agencies are becoming increasingly understaffed, under funded and over run by the size of the population requesting services. In an effort to streamline state expenditures and reduce duplicated services, some school districts are expanding their services to include health and minor medical care (particularly prenatal), before and after school child care, early childhood day care programs, and extended counseling duties to include job placement and adult counseling.

Forecast #6: School districts will become social service centers for their communities. Their services will include health and medical care, affordable day care and job placement.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

4___Highly probable. Will unquestionably occur.
11___Probable. A strong possibility that it will occur.
3___Somewhat probable. A weak possibility that it will occur.
1___Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 9.4 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	4	9	2	1	☐	☐	☐	☐	☐	☐	1

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

6___Highly probable. Will unquestionably occur.
7___Probable. A strong possibility that it will occur.
6___Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
1___Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 8.42 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	2	5	9	3	☐	☐	☐	☐	☐	☐	☐	1

Scenario #7: With the break up of the Soviet Union and the unification of Germany, the need for economic strength will far out weigh the need for military might. Moving into the next century, the world economy will be based around three major trading blocs and their trade, economic and diplomatic links. These trading blocs are Japan and the Pacific Rim, the United States and a unified Europe. Two of the fastest developing industries in these blocs are information technology and biological engineering.

Forecast #7: Economic rather than military strength will determine tomorrow's superpowers, and global leadership in science and technology will determine economic strength.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

10___Highly probable. Will unquestionably occur.
8___Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 5.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	6	7	4	1	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

14___Highly probable. Will unquestionably occur.
6___Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 4.25 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	8	7	5	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #8: As technology becomes more advanced and access to personalized information becomes easier to get, the role of the home may change. Some services which will become more home-based thorough technology are banking, shopping, minor medical (through two-way video and electronic monitoring), education and work (where service sector workers will process information at home and transmit it electronically to the workplace).

Forecast #8: Information technology will blur the barrier between work, school and home, resulting in an indeterminate work/school day.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

7____Highly probable. Will unquestionably occur.
8____Probable. A strong possibility that it will occur.
3____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.6 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	4	10	2	2	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

15___Highly probable. Will unquestionably occur.
5____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 7.50 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	10	7	2	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #9: By the year 1995, U.S. schools are predicted to be short 700,000 qualified teachers, and by the year 2000 the number of new graduates in education is expected to satisfy only 60% of the new hire demand. By as early as 1995, most states are expected to implement alternative routes to teacher certification as one solution to these shortages, particularly in science.

Forecast #9: School districts will increasingly utilize business and industry trained professionals as classroom teachers.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

2____Highly probable. Will unquestionably occur.
13___Probable. A strong possibility that it will occur.
4____Somewhat probable. A weak possibility that it will occur.
1____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 7.5 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	9	9	1	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

3____Highly probable. Will unquestionably occur.
12___Probable. A strong possibility that it will occur.
5____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 6.75 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	12	6	1	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #10: The agrarian based society is gone. The industrial/manufacturing based society is declining. The prime resources of the future are information and knowledge. Advances in computer technology and micro electronics has led to an explosion in the data processing ability of companies and individuals. This information based economy will prize human intelligence as a major resource, data tailored to the individual as the primary output, and biotechnology as the primary science.

Forecast #10: The United States will continue to move from an industrial based economy to an information based economy where human intelligence, specialized data processing and biological engineering are the key components.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

9___Highly probable. Will unquestionably occur.
9___Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	7	7	2	1	☐	☐	1	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

12___Highly probable. Will unquestionably occur.
7___Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 8.25 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	2	7	9	1	☐	1	☐	☐	☐	☐	☐	☐

Scenario #11: Within the next twenty years, many corporations are expected to trim their management hierarchies to half of their current levels. These corporations will be moving towards a more efficient management style of "networking", where lower level employees will operate more independently with increased decision-making responsibilities. Some operations previously handled "in- house" will be networked via technology to specialists outside or across the corporation. Small firms providing highly specialized services will fill in the gaps left by these restructured large firms.

Forecast #11: Through computer technology and networking, small companies will be able to compete successfully with large firms. Networks or management teams will replace management hierarchies in most corporations.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

2____Highly probable. Will unquestionably occur.
15__ Probable. A strong possibility that it will occur.
2____Somewhat probable. A weak possibility that it will occur.
1____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.3 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	3	12	2	2	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

5____Highly probable. Will unquestionably occur.
15__ Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 8.25 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	2	3	15	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #12: Interactive distance learning, the live two-way interactive use of video technology, will expand the resources of many school systems to include teachers and classrooms of neighboring or far-away districts. Students in one classroom may see and hear teachers/classrooms from other districts and vice-versa. The sharing of resources (teachers) via two-way interactive television will expand the specialized and higher order course offerings of many school districts, particularly small or rural districts.

Forecast #12: Distance learning will be used extensively to bring quality, comprehensive learning experiences to all students.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

10__Highly probable. Will unquestionably occur.
10__Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 7.8 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	3	6	8	3	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:

Frequency Distribution of Round Two Responses

14__Highly probable. Will unquestionably occur.
5___Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 7.50 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	11	6	1	1	☐	☐	☐	☐	☐	☐	☐

Scenario #13: In a recent Roper Organization poll, AIDS, crime and drug abuse were the issues listed about which Americans were the most concerned. One of these, drug abuse, has many educators worried. Children born to mothers who are drug users, particularly the drug "crack", are more likely to be born with physical impairments than are children of non-drug using mothers, and are several times more likely to be socially, emotionally or intellectually delayed. These children, who will often exhibit multiple disorders, will have special educational needs.

Forecast #13: The problems exhibited by children born to drug addicted mothers will cause educators to alter the approaches they utilize in educating children. New definitions for achievement may result and categories of special education may be expanded.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

7___Highly probable. Will unquestionably occur.
7___Probable. A strong possibility that it will occur.
5___Somewhat probable. A weak possibility that it will occur.
1___Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 6.6 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	**2**	**9**	**8**	☐	☐	☐	☐	☐	☐	☐	☐	**1**

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

8___Highly probable. Will unquestionably occur.
6___Probable. A strong possibility that it will occur.
6___Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 6.11 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	**2**	**10**	**6**	☐	☐	☐	☐	☐	☐	☐	☐	**2**

Scenario #14: In the future the organizational structure of schools will be called into question. Time-based promotion, age-graded classrooms and Carnegie units will be considered a less efficient educational structure. The needs of individual students will be seen as more important than traditional grouping practices.

Forecast #14: In the future, promotion between grade levels and graduation will be based upon the individual mastery of educational concepts and not by age. Students will be expected to exhibit mastery of pre-specified outcomes prior to promotion or graduation.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

5 Highly probable. Will unquestionably occur.
8 Probable. A strong possibility that it will occur.
5 Somewhat probable. A weak possibility that it will occur.
1 Somewhat improbable. A weak possibility that it will not occur.
___Improbable. A strong possibility that it will not occur.
___Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	**5**	**11**	**1**	**2**	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

7 Highly probable. Will unquestionably occur.
9 Probable. A strong possibility that it will occur.
4 Somewhat probable. A weak possibility that it will occur.
___Somewhat improbable. A weak possibility that it will not occur.
___Improbable. A strong possibility that it will not occur.
___Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 8.75 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	**7**	**11**	**2**	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #15: Dissatisfaction with the quality of education obtained in the traditional neighborhood school, has led many parents to pursue alternative means of educating their children.

Forecast #15: There will be a rise in the percentage of students enrolled in alternative schooling programs. These programs will include year-round classrooms, magnet schools in the arts and sciences and the use of home schooling.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

5___Highly probable. Will unquestionably occur.
8___Probable. A strong possibility that it will occur.
3___Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 7.5 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	2	6	6	2	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:

Frequency Distribution of Round Two Responses

12___Highly probable. Will unquestionably occur.
8___Probable. A strong possibility that it will occur.
____Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 4.75 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	6	10	3	1	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #16: With the break up of the Soviet Union and the unification of Germany, the need for economic strength will far out weigh the need for military might. Moving into the next century, the world economy will be based around three major trading blocs and their trade, economic and diplomatic links. These trading blocs are: Japan and the pacific Rim, the United States and a unified Europe. U.S. exports to Europe and the Pacific Rim will become critical to the economic health of the United States.

Forecast #16: There will be a continued movement toward a globalization of economic markets, communications and finance with an increased foreign ownership of U.S. industries and increased U.S. exports to foreign countries.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

11___Highly probable. Will unquestionably occur.
4___Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 7.5 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	7	7	1	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

15___Highly probable. Will unquestionably occur.
4___Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 4.50 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	4	14	2	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #17: Advancements in computer hardware and software have made the educational use of computers more viable. Software developers have made significant progress in diagnosing individual student educational needs, matching appropriate educational instruction to these needs and tracking student progress.

Forecast #17: Computer technology will become an integral part in the diagnosis of student needs, the development of prescriptive instruction, and the monitoring of student progress.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

12____Highly probable. Will unquestionably occur.
8____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 8.5 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	7	9	3	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:

Frequency Distribution of Round Two Responses

19____Highly probable. Will unquestionably occur.
1____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 6.75 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	12	6	1	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #18: There is a growing mismatch between the literacy level (vocabulary, reading and writing skills) of high school graduates and the competencies required by the jobs available. By the year 2000, three-fourths of new work force entrants will be qualified for only 40% of the jobs available. As a result, many industries are asking schools to produce graduates who can not only read and write but also have competencies in problem solving, communications and computers.

Forecast #18: Businesses will increasingly demand greater skills of high school graduates in problem solving, communications and computer literacy.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

13___Highly probable. Will unquestionably occur.
7___Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 6.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	5	6	9	☐	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:

Frequency Distribution of Round Two Responses

19___Highly probable. Will unquestionably occur.
1___Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 3.00 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	10	8	2	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #19: Large scale employers are increasingly seeing the need to teach remedial and/or specialized occupational skills to their employees. U.S. employers spend $210 billion annually on training of the national work force, an increase of over 70% between 1985 and 1988. Also rising is the number of companies sponsoring English educational programs to immigrant workers. In the near future, it is predicted that immigrants will fill more than one-fifth of all new jobs in the United States.

Forecast #19: Over half of all large companies (10,000+ workers) will offer some means of formal or informal education for their employees in the future.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

12__Highly probable. Will unquestionably occur.
5___Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 7.8 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	4	2	10	2	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:

Frequency Distribution of Round Two Responses

20__Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 5.00 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	7	7	5	1	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #20: Social and environmental issues are increasingly becoming public concerns. Issues such as drugs, AIDS, the "greenhouse effect", and the destruction of the rainforest are becoming a focus of national and international policy.

Forecast #20: There will be an increase in public attention to social and environmental issues.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

14___Highly probable. Will unquestionably occur.
6____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 4.8 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	6	9	5	☐	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:

Frequency Distribution of Round Two Responses

19___Highly probable. Will unquestionably occur.
1____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 3.25 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	8	11	1	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #21: Information technology will allow people to have virtual experiences in which they can "go" somewhere and touch, see, hear and possibly smell things as though they were there. They will do this without going anywhere. Virtual reality will inspire students and improve learning.

Forecast #21: "Virtual reality" will become a tool for teaching, particularly geography, history, science and someday math.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

2____Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 12.5 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	1	1	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

10___Highly probable. Will unquestionably occur.
7____Probable. A strong possibility that it will occur.
3____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.75 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	5	8	6	1	☐	☐	☐	☐	☐	☐	☐

Scenario #22: Increasing numbers of states are facing crises with respect to funding public education. Several states' funding formulas have been determined unconstitutional or are under pressure due to tax caps and.or concerns about inequality. Continually increasing costs of education combined with a shift in population demographics (aging, increased percentage of minorities, etc.) will force changes in how public education is funded.

Forecast #22: Inequities in funding of public schools will recieve increasing levels of public attention resulting in court ordered restructuring of educational finances. This may include a shift from local to state (from private property tax formulas to sales or income tax formulas).

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

____Highly probable. Will unquestionably occur.
2___Probable. A strong possibility that it will occur.
____Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 7.5 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	1	1	☐	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

8___Highly probable. Will unquestionably occur.
11__Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 6.75 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	3	8	8	1	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #23: Support for education reform and options will grow. The use of the voucher system will allow any student the opportunity to attend the school of their choice, public or private.

Forecast #23: Students will be given vouchers to purchase their education from many sources, public or private.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

1___Highly probable. Will unquestionably occur.
1___Probable. A strong possibility that it will occur.
____Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 5.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

1___Highly probable. Will unquestionably occur.
6___Probable. A strong possibility that it will occur.
7___Somewhat probable. A weak possibility that it will occur.
5___Somewhat improbable. A weak possibility that it will not occur.
1___Improbable. A strong possibility that it will not occur.
____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 6.05 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	11	4	☐	1	☐	☐	☐	☐	☐	☐	☐

Scenario #24: Computer networks are by-passing traditional media channels - i.e. bringing the real info to the world from the Chinese student rebellion and from the former Soviet Union. These networks will become more widely used and have a major effect on politics, ecology, environment, economy, etc.

Forecast #24: A more efficient kind of internet will be developed that can be accessed and used easily from any site.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

1___Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 5.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

14___Highly probable. Will unquestionably occur.
5___Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 8.00 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	10	8	2	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #25: Information and communication technology at the global scale and differences in time zones will make global communication an around the clock around the globe affair. We will be able to, and need to, reach-out from our homes to the world.

Forecast #25: Just as the office at home is already a reality, the classroom at home will be a supplement to formal school classrooms. The media room at home will be the growth center for adults and children alike.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
1___Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 15.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

4___Highly probable. Will unquestionably occur.
14__Probable. A strong possibility that it will occur.
2___Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 11.75 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	2	9	7	2	☐	☐	☐	☐	☐	☐	☐

Scenario #26: Volunteering will become increasingly important in society as the population grows, money shrinks and the need for support of social service agencies increases.

Forecast #26: Volunteering, off-campus programs, learning in the community, helping others, tutoring, working/studying in social agencies and hospitals, et al. will dramatically increase in the coming years.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

1____Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:

Frequency Distribution of Round Two Responses

11___Highly probable. Will unquestionably occur.
5____Probable. A strong possibility that it will occur.
2____Somewhat probable. A weak possibility that it will occur.
2____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 8.50 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	10	7	2	1	☐	☐	☐	☐	☐	☐	☐

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Scenario #27: Recognition that environment (school buildings) affects learning is growing rapidly. New advances in technology/information retrieval is changing the design of learning spaces. Teaching methodology in all curriculum areas is being dramatically changed through the use of new technology.

Forecast #27: The relationship between learning, technology and physical facilities will play a major role in restructuring education and the planning of new schools.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

1____Highly probable. Will unquestionably occur.
1____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	2	☐	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

8____Highly probable. Will unquestionably occur.
8____Probable. A strong possibility that it will occur.
4____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 9.25 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	7	10	2	1	☐	☐	☐	☐	☐	☐	☐

Scenario #28: Group paced instruction, required courses for all, inflexible schools, mandatory attendance, ABCDF report cards, one set of regulations for all, tracking, ability grouping, GATE/Special Education segregations, et al. have been the forces of existence preventing learning from replacing schooling and therefore must be eliminated.

Forecast #28: Traditional schedules, mandated report cards, required classes for all, segregated learning as in"at risk" attendance programs and other indefensible trappings of schooling will be eliminated as part of the transformation to a new society and learning will truly be more individualized and personalized.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

- ____Highly probable. Will unquestionably occur.
- 1____Probable. A strong possibility that it will occur.
- ____Somewhat probable. A weak possibility that it will occur.
- ____Somewhat improbable. A weak possibility that it will not occur.
- ____Improbable. A strong possibility that it will not occur.
- ____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 15.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:

Frequency Distribution of Round Two Responses

- 2____Highly probable. Will unquestionably occur.
- 12____Probable. A strong possibility that it will occur.
- 5____Somewhat probable. A weak possibility that it will occur.
- 1____Somewhat improbable. A weak possibility that it will not occur.
- ____Improbable. A strong possibility that it will not occur.
- ____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 13.50 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	1	6	11	2	☐	☐	☐	☐	☐	☐	☐

Scenario #29: The greatest need for workers in the next twenty years (in terms of numbers) is not in technological industries but as custodians, restaurant workers, garbage collectors- those not requiring a high school diploma, thus focusing education on appropriate programs for non-college, non-technical graduates.

Forecast #29: Schools will change their focus from beating the Japanese, high test scores and core curriculum, and begin to plan more appropriate and meaningful- but not segregated- programs for those who will work in restaurants and other non-technical, non-college jobs.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
1____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

_____Highly probable. Will unquestionably occur.
7____Probable. A strong possibility that it will occur.
11___Somewhat probable. A weak possibility that it will occur.
1____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 11.75 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	12	5	7	☐	☐	☐	☐	☐	☐	☐

Scenario #30: Non educational responsibilities- social issues such as AIDS education, distribution of condoms, child care, will continue to be placed upon the public schools. These responsibilities take time away from curricular activities.

Forecast #30: As a result of the increase in non-educational responsibilities on the part of the public schools (AIDs education, distribution of condoms, child care, etc.) private schools will increase in enrollment- up to one third of the national school age population.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
1___Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:

Frequency Distribution of Round Two Responses

1___Highly probable. Will unquestionably occur.
4___Probable. A strong possibility that it will occur.
7___Somewhat probable. A weak possibility that it will occur.
7___Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 10.88 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	3	9	4	1	☐	☐	☐	☐	☐	☐	1

Scenario #31: Commercial firms dealing with technology have produced sophisticated educational programs such as IBM Writing to Read and their math program. These have been very successful in the public schools.

Forecast #31: IBM and Apple merge in an effort to open private schools where students are taught all subjects using CAI (Computer Assisted Instruction) methodology. These schools for profit will come into existence in the near future.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
1____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.0 years

Frequency Distribution of RoundOne Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

1____Highly probable. Will unquestionably occur.
3____Probable. A strong possibility that it will occur.
10___Somewhat probable. A weak possibility that it will occur.
6____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 11.39 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	1	11	6	☐	☐	☐	☐	☐	☐	☐	1

Scenario #32: There is increasing democracy in all institutions and countries including reduction of totalitarianism and business participatory management.

Forecast #32: Schools will increasingly give major decision powers to stakeholders (parents, teachers, students), including giving much greater decision power to students to set goals and decide their program.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
2___Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 5.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

5___Highly probable. Will unquestionably occur.
6___Probable. A strong possibility that it will occur.
7___Somewhat probable. A weak possibility that it will occur.
1___Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 8.94 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	9	5	2	2	☐	☐	☐	☐	☐	☐	☐

Scenario #33: Since 1983, school districts, legislative and federal groups have played with the educational system with little or no results. The latest effort to find out "what" and "how" to fix the system (New American School Development Corporation) which will not work because the design is to create new models and replace what works. This will take forever- business would never try this approach.

Forecast #33: Change will come at the local level through the application of a processes approach (TQM is an example) that focuses on the customer's needs, results and customer satisfaction. Applying sound methodology for change which focuses on attaining positive results for students will drive the education system.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

1___Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

3___Highly probable. Will unquestionably occur.
8___Probable. A strong possibility that it will occur.
6___Somewhat probable. A weak possibility that it will occur.
2___Somewhat improbable. A weak possibility that it will not occur.
1___Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 9.47 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	2	17	☐	☐	☐	☐	☐	☐	☐	☐	1

Scenario #34: Economic forces continue to provide the impetus for the design/ development of highly interactive and well designed educational software. The software will be available to, and and purchased by, educators as well as the general public (perhaps through interactive on-line services.

Forecast #34: Continually increasing use of powerful information technologies in formal schooling (as well as in more informal settings) will force the redefinition of the roles of building administrators, teachers and learners.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
1____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 15.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

9____Highly probable. Will unquestionably occur.
11___Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 8.50 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	6	11	2	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #35: Expert systems will increasingly aid all kinds of workers- making them more effective and productive. Teachers are no exception, expert systems will allow them access to greater information, help tailor lessons, track students, design exams. They will be used with PC tutors.

Forecast #35: Teachers will double or triple the number of students they can manage at one time with expert systems and coordinated use of PC-based tutoring programs.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
1____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

2____Highly probable. Will unquestionably occur.
7____Probable. A strong possibility that it will occur.
8____Somewhat probable. A weak possibility that it will occur.
2____Somewhat improbable. A weak possibility that it will not occur.
1____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 12.89 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	1	11	5	☐	1	1	☐	☐	☐	☐	☐

Scenario #36: The Proposed Minnesota Experimental City was planned for 250,000 people with NO schools. The city was the living learning laboratory. everyone was a teacher, everyone a learner. The New Generation American School Corporation grants have given the eleven grantees the licence to do similar experiments. One day there will be a community without schools.

Forecast #36: Schooling cannot continue to exist, but must transition to education and finally to learning in a transformed society where there will be no 9:00-3:00, K-12 schools as exist in 1992.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
1____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 30.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	☐	☐	☐	☐	1	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

2____Highly probable. Will unquestionably occur.
2____Probable. A strong possibility that it will occur.
5____Somewhat probable. A weak possibility that it will occur.
7____Somewhat improbable. A weak possibility that it will not occur.
3____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 22.50 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	1	5	2	8	1	☐	☐	☐	1	1

Scenario #37: Educators are increasingly finding it necessary to bring in social agencies of the community to help them solve problems of students. The need for close cooperation between the school and such agencies as the welfare office, social security office, juvenile court, state/county employment offices and other offices has become very evident to educators.

Forecast #37: New elementary schools will be planned and designed as community schools. Existing schools will be expanded to include the community school concept where social agencies are physically located in the school and work closely with school personnel.

Probability of the above forecast becoming widespread:

Frequency Distribution of Round One Responses

1____Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 0.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	**1**	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:

Frequency Distribution of Round Two Responses

11___Highly probable. Will unquestionably occur.
6____Probable. A strong possibility that it will occur.
3____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?

Mean= 7.25 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	**2**	**9**	**7**	**2**	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #38: Society has begun to acknowledge learning as a 24 hour, year long, and hopefully life long activity. Learning need not end during the summer or while on vacation. Recognizing the need for a different kind of school, parents are schooling children themselves, corporations are training workers in-house and people of all ages are learning through technology at home. Each of these needs could be met locally and cost effectively at one site.

Forecast #38: Community learning centers (or learning access centers), created around a multi-media technology center, will be open year-round and around-the-clock to serve learners of all ages. These centers would also be available to tourists on vacation.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

1 Highly probable. Will unquestionably occur.
_____ Probable. A strong possibility that it will occur.
1 Somewhat probable. A weak possibility that it will occur.
_____ Somewhat improbable. A weak possibility that it will not occur.
_____ Improbable. A strong possibility that it will not occur.
_____ Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	1	☐	1	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

6 Highly probable. Will unquestionably occur.
6 Probable. A strong possibility that it will occur.
7 Somewhat probable. A weak possibility that it will occur.
_____ Somewhat improbable. A weak possibility that it will not occur.
1 Improbable. A strong possibility that it will not occur.
_____ Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 12.25 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	1	10	8	1	☐	☐	☐	☐	☐	☐	☐

Scenario #39: Formal study in school greatly reduced to K to average age of 11 or 12. Older students 1/3 work, 1/3 independent study with computer assistance, 1/3 age group studies and activities. Many high schools will be long closed, instead there will be neighborhood centers with multiple uses.

Forecast #39 : Teacher role, function preparation, radical change in new roles include tutor, day care expert, consulting expert, coach developmental psychologist, planner, arranger, etc.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
1____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 25.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	☐	☐	☐	1	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

2____Highly probable. Will unquestionably occur.
9____Probable. A strong possibility that it will occur.
6____Somewhat probable. A weak possibility that it will occur.
1____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 15.56 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	☐	6	4	5	☐	2	☐	☐	☐	☐	☐

Scenario #40: The fact that we are running out of air space for television channels means that as they multiply, they will have to be transmitted through underground wiring while telephones will be transmitted through air space . The new administration will promote this change through legislation that will effect telephone companies and make it cost effective to run underground fiber.

Forecast #40: Fiber optic networks will link homes throughout the U.S. to business, educational institutions and services, banks, etc.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_1__Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 5.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

14__Highly probable. Will unquestionably occur.
5___Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.50 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	6	9	2	3	☐	☐	☐	☐	☐	☐	☐

Scenario #41: If the human potential is truly the capital of the future then we should all pay into a life-long learning fund. The fund provides every individual with learning stock which we can use to pay for education, books, videos, special symposia, discovery vacations or certification programs. Every citizen has a life long long learning N^{o} (L^{4}). It is an account started at birth and ends with death.

Forecast #41: We will have learning credit accounts used to pay for any educational/ learning certified program or activity.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
1____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 20.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	☐	☐	1	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

_____Highly probable. Will unquestionably occur.
3____Probable. A strong possibility that it will occur.
6____Somewhat probable. A weak possibility that it will occur.
8____Somewhat improbable. A weak possibility that it will not occur.
2____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 20.59 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	2	2	8	2	3	☐	☐	☐	☐	1

Scenario #42: Consortium of computer companies decides to put PCs in front of every school child. This initiates a greatly increased use of computers in school. New discoveries about learning result and networks expand.

Forecast #42: Learning (computer based) becomes a national (and global) network-based process. Cross boundary fertilization of education and educational ideas, i.e. U.S.-Japan interchange.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
1____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 30.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	☐	☐	☐	☐	1	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

3____Highly probable. Will unquestionably occur.
16___Probable. A strong possibility that it will occur.
1____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 15.00 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	4	5	3	5	2	☐	1	☐	☐	☐	☐

Scenario #43: Buckminster Fuller stated the only thing that really counts in the curriculum is air, water and food- for we can only live 5 minutes without air, 5 days without water and 5 weeks without food. Reading, math, traditional subjects- even nuclear weapons- pale until we can guarantee for all the environmental essentials.

Forecast #43: Traditional requirements will give way to really important, crucial studies, such as the 64 global delimas, which are really one, one-macroproblem- how to become the way to a preferable future for humankind.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
1____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 15.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	☐	1	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

_____Highly probable. Will unquestionably occur.
5____Probable. A strong possibility that it will occur.
2____Somewhat probable. A weak possibility that it will occur.
6____Somewhat improbable. A weak possibility that it will not occur.
2____Improbable. A strong possibility that it will not occur.
1____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 19.38 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	2	6	4	☐	1	☐	1	☐	1	1

Scenario #44: Given the complexity of events facing school leaders, training programs from professional organizations and institutions of higher education professional schools will increase their use of cohorting students.

Forecast #44: The professional schools will continue to develop their students into "team" group cohesive decision makers.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round One Responses

_____Highly probable. Will unquestionably occur.
_1___Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 5.0 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

_2___Highly probable. Will unquestionably occur.
_9___Probable. A strong possibility that it will occur.
_5___Somewhat probable. A weak possibility that it will occur.
_1___Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 10.29 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	4	8	2	1	1	☐	☐	☐	☐	☐	☐

Scenario #45 (New): The past 60 years there has been no significant change in American education. Schools still have ABC report cards, period 1-2-3 schedules, required core courses, 1st-7th-12th grades, self-contained rooms, assigned teachers, bells, and group paced instruction. Efforts such as the development of the middle school (grades 6-7-8) to date have only been cosmetic.

Forecast #45 (New): Given the failure of the schools to respond to the call for change in the 30's and 60's, there is little hope for significant change in the 90's. Therefore in 2020, except for some technology additions, schools will be structured much as they were to start 1990.

Probability of the above forecast becoming widespread:
Frequency Distribution of Round Two Responses

_____Highly probable. Will unquestionably occur.
_____Probable. A strong possibility that it will occur.
_____Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
1____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

Time: The above forecast will become widespread in how many years?
Mean= 30.00 years

Frequency Distribution of Round Two Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	☐	☐	☐	☐	1	☐	☐	☐	☐	☐

Appendix G

Round Three Request to Participate

Round Three Response Sheet

Round Three Survey Instrument

LETTERHEAD

May 28, 1993

Name
Organization
Street
City, State, Zip Code

Dear Name:

In many of the elementary and secondary schools across this nation, school boards and administrators are wrestling with a perplexing problem, how to educate students in facilities that are structurally sound but that are quickly becoming inadequate to house the educational programs of today's changed curriculum. School facilities designed and constructed only twenty years ago were adequate to house then existing enrollments, but changes in school offerings such as education for the handicapped, disadvantaged, gifted, and computer technology, have precipitated the remodeling and overcrowding of today's school buildings.

American architect Louis Sullivan once stated, that "form ever follows function," a principle that asserts that the design of a building must logically be based upon the activity housed within it. In the case of school facilities, the form of the school building is static throughout the forty to ninety year lifespan of the building, however, the function of education often changes dramatically during this same time period. Due to evolving school programs and services, the lengthy lifespan of the typical school building, and the substantial fiscal commitment required from the community for remodeling or new construction, school structures must be designed with future function and form in mind.

In an effort to generate a clearer picture of future educational programs and thus a better perception of future school facility architecture, I have developed a Delphi study involving this nation's reputationally elite futurists, architects and educators. The Delphi study was chosen as the appropriate research methodology for this investigation because it permits experts from different disciplines and locations to interact anonymously on a problem without face-to-face interaction. In a recent series of questionnaires to journal editors, your name was nominated repeatedly as a professional with expertise and interest in educational, social, technological, or architectural futures. Based upon this reputational nomination, I am asking for your participation in my study.

This Delphi study is two-part and involves a series of five open-ended questionnaires, with feedback after each questionnaire. Part A of the study (the first two questionnaires) was designed to generate consensus as to those societal, technological or environmental factors which will effect future K-12 education. Part B of the study (questionnaires three through five) will examine the impact of these societal, technological or environmental factors on future educational architecture. **Due to the comprehensive nature of this study, I am asking for your participation in only the final three rounds of questionnaires (Part B of the study).** A different but reputationally similar sample group has already completed Part A of the study. Following nomination, selection to Part A or Part B of the study was random.

In the third questionnaire you will be given a series of social, technological or environmental factors forecasted to impact future K-12 education. Based upon these factors you will be asked to briefly write what architectural characteristics (educational specifications) future school facilities must have to optimally house the educational program. These responses will be compiled and condensed by the researcher.

In the fourth questionnaire, you will receive the compiled responses from the other participants as feedback. After reading the the other participant's responses, you will be asked to re-respond to the initial question of what architectural characteristics (educational specifications) must future school facilities have to optimally house the educational program. In addition, participants will be asked to rate each characteristic on a six point Likert scale as to probability, ranging from no probability to high probability of occurrence, and also years to widespread acceptance. The responses will be compiled by the researcher, placing them into emergent themes.

In the final questionnaire, you will be given a compiled listing of architectural characteristics by emergent theme along with quantitative feedback (mean and frequency distribution) on probability of occurrence and years to widespread acceptance. You will be asked to make any final additions or changes to your responses, as well as re-responding to probability of occurrence and years to widespread acceptance. Returning the third questionnaire would complete your obligation to the study.

I hope you will join me in this study by returning the enclosed response sheet prior to **June 14th.** Please note that the initial responses should be sent to a summer address at the University of Nebraska. A stamped, self addressed envelope has been included for your response. The first questionnaires will be mailed out on June 15th, with additional rounds of surveys scheduled for every five weeks. Your creativity, expertise and vision could greatly enhance the success of this study, therefore, your participation is very important and appreciated.

Sincerely,

Kelvin L. McMillin

Enc.

BEST COPY AVAILABLE

Name
Organization
Street
City, State, Zip Code

Dear Name:

As a member of a reputationally elite group, I am asking for your participation in a research study of the effect of forecasted social and technological futures on K-12 school architecture. Your obligation to this study would be to complete three iterative questionnaires on the effect of forecasted futures on school facility design.

The first questionnaire will be distributed on June14th, with successive questionnaires being distributed approximately every five weeks. Care has been taken to ensure the anonymity of each respondent. The only personal information recorded will be summative and involve the primary occupation of the respondents.

Your creativity, expertise and vision could greatly enhance the success of this study, therefore, your participation would be greatly appreciated. Please return this response sheet prior to
June 14, 1993. I thank you for your time and consideration in this matter.

Sincerely,

Kelvin L. McMillin

[ ] Yes, I will participate in this study of the effect of social and technological futures on school architecture.

[ ] No, I will not participate in this study of the effect of social and technological futureson school architecture.

Architectural Programming
For
Educational Futures

Round One

New Franklin R-1 School District

"A Recognized School of Excellence"
United States Department of Education

June 1993

June 15, 1993

Dear Colleague:

In many of the elementary and secondary schools across this nation, school boards and administrators are wrestling with a perplexing problem, how to educate students in facilities that are structurally sound but that are quickly becoming inadequate to house the educational programs of today's changed curriculum. School facilities designed and constructed only twenty years ago were adequate to house then existing enrollments, but changes in school offerings such as education for the handicapped, disadvantaged, gifted, and computer technology, have precipitated the remodeling and programmatic overcrowding of today's school facilities. Due to the lengthy lifespan of the typical school building, the increasingly changing school curriculum and the substantial fiscal commitment required from the community for remodeling or new construction, school structures must be designed with the future of education in mind.

The following pages list a variety of scenarios and forecasts concerning the future of education and of this nation. These forecasts were developed by a group of reputationally elite experts such as yourself, for the purpose of providing you with reasoned group concensus of the future. Your role in this study is to read the scenario and forecast, then based upon the forecast, write an educational specification for future school facilities (what effect you think this will have on future school architecture). If the forecast will have no effect on future school facilities please mark the box at the bottom of the page and go on to the next forecast. A description of an educational specification and a sample forecast from two decades ago has been included on the following pages.

Do not be concerned that your response may be unusual or out of the norm. You have been selected for your diversity as well as your expertize. Following this round, the responses from all of the participants will be compiled and returned for you to read and re-evaluate. The response that you considered unusual may be the response which triggers a brainstorm in another participant.

I hope you will find this survey enjoyable and informative. Your response to each of these forecasts will help to generate ideas for others in round two of the survey. In round two, your examination of other participant's responses and your re-response will help to generate eventual concensus. As always, your participation, expertise and vision greatly enhance the success of this study. Please return this survey in the enclosed postage paid envelope no later than **July 10, 1993**.

Sincerely,

Kelvin L. McMillin

Educational Specifications

Typically, the creation of a school facility has three major steps 1) the development of educational specifications (architectural programming), 2) the development of architectural drawings or plans based upon these specifications (architectural design), and 3) the actual construction of the building utilizing the architect's plans. The development of educational specifications (generically termed architectural programming) is an organized process of inquiry whereby problems concerning function, form, economy, time and energy are defined. When based upon the context of public education, architectural programming results in a comprehensive set of written physical, educational and community requirements which are representative of the educational aims of the school district.

Originally, the development of educational specifications was performed by the architect himself. Through time, this was changed to include both the superintendent and the architect, and eventually the advice of the board of education was added to the process. Recently, the trend in architectural programming has been the development of educational specifications by a committee of local teachers, administrators, school board officials, educational consultants and even townspeople. To date, the committee process of developing educational specifications, often termed "cooperative planning" or "participatory design," has generally reflected a local perspective. This study is one of the first to invite nationally renowned experts to develop educational specifications for tommorrow's school facilities.

Facility planning for the future requires accurate perceptions of future enrollments, curricula, society and programs; careful consideration of how these futures impact school facilities, and most of all involvement beyond one or two decision makers. The following definition of an educational specifications may assist you in forming your responses. Educational specifications are the clear and precise description of " the various learning activities to be housed in the school, their spatial requirements and special features." They are the general characteristics of a school structure necessary to adequately house the educational program. The assumption is made that educational specifications are included in and are an integral part of an architectural program for a school facility.

I thank for you for your participation in this study and your dedication to the children and school facilities of tommorrow. I hope you enjoy the survey.

Sincerely,

Kelvin L. McMillin

SAMPLE

Sample Scenario: Section 504 of the Rehabilitation Act of 1973 states "no otherwise qualified handicapped individual in the United States . . . shall solely by reason of his handicap, be excluded from participation in, or be denied the benefits of, or be subjected to discrimination under any program or or activity receiving Federal financial assistance." Furthermore, the Education for All Handicapped Children Act of 1975 declares that states receiving Federal financial assistance must identify handicapped children and provide a "free appropriate public education which emphasizes special education and related services designed to meet their unique needs."

Sample Forecast: The public schools of this nation will educate all children of their district, including those that are physically or mentally handicapped.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

Future school facilities will probably be only one-story in structure or will have elevators or wide gradual ramps from floor to floor (similiar to those used in major league ball parks). In addition, doorways to classrooms and restrooms will be wider to accomodate those children in wheelchairs. Cafteria benches will probably be replaced by movable chairs to accomodate wheelchair access.

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #1: Large scale employers are increasingly seeing the need to teach remedial and/or specialized occupational skills to their employees. U.S. employers spend $210 billion annually on training of the national work force, an increase of over 70% between 1985 and 1988. Also rising is the number of companies sponsoring English educational programs to immigrant workers. In the near future, it is predicted that immigrants will fill more than one-fifth of all new jobs in the United States.

Forecast #1: Over half of all large companies (10,000+ workers) will offer some means of formal or informal education for their employees in the future.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #2: The growth of an urban, minority underclass is likely to occur as the birth rate among families with less than a $10,000 yearly income will double that of families with a $30,000 or more yearly income. Single parent households continue to be the fastest growing family unit, particularly households headed by male single parents. Immigration is now America's greatest source of population growth.

Forecast #2: A greater proportion of tomorrow's students will enter school with one or more "strikes" against them.. These "strikes" may include poverty or lower family income, a single parent household, or a minority heritage with parents of a below-average educational level.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #3: Advancements in computer hardware and software have made the educational use of computers more viable. Software developers have made significant progress in diagnosing individual student educational needs, matching appropriate educational instruction to these needs and tracking student progress.

Forecast #3: Computer technology will become an integral part in the diagnosis of student needs, the development of prescriptive instruction, and the monitoring of student progress.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #4: There is a growing mismatch between the literacy level (vocabulary, reading and writing skills) of high school graduates and the competencies required by the jobs available. By the year 2000, three-fourths of new work force entrants will be qualified for only 40% of the jobs available. As a result, many industries are asking schools to produce graduates who can not only read and write but also have competencies in problem solving, communications and computers.

Forecast #4: Businesses will increasingly demand greater skills of high school graduates in problem solving, communications and computer literacy.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #5: Social and environmental issues are increasingly becoming public concerns. Issues such as drugs, AIDS, the "greenhouse effect", and the destruction of the rainforest are becoming a focus of national and international policy.

Forecast #5: There will be an increase in public attention to social and environmental issues.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #6: The U.S. population will increasingly reflect minority groups. The U.S. population growth will become increasingly dependent upon legal and illegal immigration. Within a decade, one in every three students will come from a minority background. At some point in the future, the "majority" population will consist of groups of "minorities." Today's majority white population will become tomorrow's minority.

Forecast #6: Future curriculum content will address the issue of diverse cultural values and languages. School personel will utilize teaching strategies that stress appreciation, understanding and the value of other cultures.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #7: With the break up of the Soviet Union and the unification of Germany, the need for economic strength will far out weigh the need for military might. Moving into the next century, the world economy will be based around three major trading blocs and their trade, economic and diplomatic links. These trading blocs are: Japan and the pacific Rim, the United States and a unified Europe. U.S. exports to Europe and the Pacific Rim will become critical to the economic health of the United States.

Forecast #7: There will be a continued movement toward a globalization of economic markets, communications and finance with an increased foreign ownership of U.S. industries and increased U.S. exports to foreign countries.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #8: As technology becomes more advanced and access to personalized information becomes easier to get, the role of the home may change. Some services which will become more home-based thorough technology are banking, shopping, minor medical (through two-way video and electronic monitoring), education and work (where service sector workers will process information at home and transmit it electronically to the workplace).

Forecast #8: Information technology will blur the barrier between work, school and home, resulting in an indeterminate work/school day.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #9: With the break up of the Soviet Union and the unification of Germany, the need for economic strength will far out weigh the need for military might. Moving into the next century, the world economy will be based around three major trading blocs and their trade, economic and diplomatic links. These trading blocs are Japan and the Pacific Rim, the United States and a unified Europe. Two of the fastest developing industries in these blocs are information technology and biological engineering.

Forecast #9: Economic rather than military strength will determine tomorrow's superpowers, and global leadership in science and technology will determine economic strength.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #10: Interactive distance learning, the live two-way interactive use of video technology, will expand the resources of many school systems to include teachers and classrooms of neighboring or far-away districts. Students in one classroom may see and hear teachers/classrooms from other districts and vice-versa. The sharing of resources (teachers) via two-way interactive television will expand the specialized and higher order course offerings of many school districts, particularly small or rural districts.

Forecast #10: Distance learning will be used extensively to bring quality, comprehensive learning experiences to all students.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #11: Computer networks are by-passing traditional media channels - i.e. bringing the real information to the world from the Chinese student rebellion and from the former Soviet Union. These networks will become more widely used and have a major effect on politics, ecology, environment, economy, etc.

Forecast #11: A more efficient kind of internet will be developed that can be accessed and used easily from any site.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #12: The fact that we are running out of air space for television channels means that as they multiply, they will have to be transmitted through underground wiring, while telephones will be transmitted through air space. The new administration will promote this change through legislation that will effect telephone companies and make it cost effective to run underground fiber.

Forecast #12: Fiber optic networks will link homes throughout the U.S. to business, educational institutions and services, banks, etc.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #13: Dissatisfaction with the quality of education obtained in the traditional neighborhood school has led many parents to pursue alternative means of educating their children.

Forecast #13: There will be a rise in the percentage of students enrolled in alternative schooling programs. These programs will include year-round classrooms, magnet schools in the arts and sciences and the use of home schooling.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities..

Scenario #14: The number of households in America continues to grow at a faster rate than does the population. The greatest growth in population is occuring in single income, single parent families making less than $10,000 per year. This growth is approaching twice that of double income families making $30,000 or more per year. As poorer familes get larger, wealthier families get smaller. One result of this economic and birth inequality is that smaller, wealthier families will be more financially able to afford the newer technologies as they are developed

Forecast #14: Economic differences between double income families and single parent families will increase. One result of this economic inequality will be the development of technological haves and have nots in society.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #15: The agrarian based society is gone. The industrial/manufacturing based society is declining. The prime resources of the future are information and knowledge. Advances in computer technology and micro electronics has led to an explosion in the data processing ability of companies and individuals. This information based economy will prize human intelligence as a major resource, data tailored to the individual as the primary output, and biotechnology as the primary science.

Forecast #15: The United States will continue to move from an industrial based economy to an information based economy where human intelligence, specialized data processing and biological engineering are the key components.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #16: Economic forces continue to provide the impetus for the design/ development of highly interactive and well designed educational software. The software will be available to, and and purchased by, educators as well as the general public (perhaps through interactive on-line services.

Forecast #16: Continually increasing use of powerful information technologies in formal schooling (as well as in more informal settings) will force the redefinition of the roles of building administrators, teachers and learners.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #17: Educators are increasingly finding it necessary to bring in social agencies of the community to help them solve problems of students. The need for close cooperation between the school and such agencies as the welfare office, social security office, juvenile court, state/county employment offices and other offices has become very evident to educators.

Forecast #17: New elementary schools will be planned and designed as community schools. Existing schools will be expanded to include the community school concept where social agencies are physically located in the school and work closely with school personnel.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #18: Social demand for education will increase while public expenditure for education will continue to be restricted. Government role will remain limited, but more federal funds may be spent in "matching" local efforts to finance educational innovations and research. Programs that enhance the basic curriculum may be financed through alternative means such as foundations.

Forecast #18: School districts will turn to private donations and foundations to supplement appropriations from local, state and federal governments. These funds will not be meant to replace government funds, but to enhance them.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #19: The U.S. population will continue to grow older as the median age of the population continues to rise. The aging of the "baby boomers", and advances in health care, nutrition and lifestyle will result in an increase of the proportion of middle aged and older adults in the U.S. population (age 35 and older). These older, mature adults will look to their local schools for continued, personal education and as classroom volunteers.

Forecast #19: Public Schools of the future will be called upon to educate not only students from the traditional ages of 5-17, but also older, even retired, adults. This expanded "adult education" role may include weekend or evening programs.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #20: Information technology will allow people to have virtual experiences in which they can "go" somewhere and touch, see, hear and possibly smell things as though they were there. They will do this without going anywhere. Virtual reality will inspire students and improve learning.

Forecast #20: "Virtual reality" will become a tool for teaching, particularly geography, history, science and someday math.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #21: Increasing numbers of states are facing crises with respect to funding public education. Several states' funding formulas have been determined unconstitutional or are under pressure due to tax caps and/or concerns about inequality. Continually increasing costs of education combined with a shift in population demographics (aging, increased percentage of minorities, etc.) will force changes in how public education is funded.

Forecast #21: Inequities in funding of public schools will recieve increasing levels of public attention resulting in court ordered restructuring of educational finances. This may include a shift from local to state (from private property tax formulas to sales or income tax formulas).

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #22: Within the next twenty years, many corporations are expected to trim their management hierarchies to half of their current levels. These corporations will be moving towards a more efficient management style of "networking", where lower level employees will operate more independently with increased decision-making responsibilities. Some operations previously handled "in- house" will be networked via technology to specialists outside or across the corporation. Small firms providing highly specialized services will fill in the gaps left by these restructured large firms.

Forecast #22: Through computer technology and networking, small companies will be able to compete successfully with large firms. Networks or management teams will replace management hierarchies in most corporations.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #23: Recognition that environment (school buildings) affects learning is growing rapidly. New advances in technology/information retrieval is changing the design of learning spaces. Teaching methodology in all curriculum areas is being dramatically changed through the use of new technology.

Forecast #23: The relationship between learning, technology and physical facilities will play a major role in restructuring education and the planning of new schools.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #24: In the future the organizational structure of schools will be called into question. Time-based promotion, age-graded classrooms and Carnegie units will be considered a less efficient educational structure. The needs of individual students will be seen as more important than traditional grouping practices.

Forecast #24: In the future, promotion between grade levels and graduation will be based upon the individual mastery of educational concepts and not by age. Students will be expected to exhibit mastery of pre-specified outcomes prior to promotion or graduation.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #25: Recognition that environment (school buildings) affects learning is growing rapidly. New advances in technology/information retrieval is changing the design of learning spaces. Teaching methodology in all curriculum areas is being dramatically changed through the use of new technology.

Forecast #25: The relationship between learning, technology and physical facilities will play a major role in restructuring education and the planning of new schools.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #26: In a recent Roper Organization poll, AIDS, crime and drug abuse were the issues listed about which Americans were the most concerned. One of these, drug abuse, has many educators worried. Children born to mothers who are drug users, particularly the drug "crack", are more likely to be born with physical impairments than are children of non-drug using mothers, and are several times more likely to be socially, emotionally or intellectually delayed. These children, who will often exhibit multiple disorders, will have special educational needs.

Forecast #26: The problems exhibited by children born to drug addicted mothers will cause educators to alter the approaches they utilize in educating children. New definitions for achievement may result and categories of special education may be expanded.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #27: Information and communication technology at the global scale and differences in time zones will make global communication an around the clock around the globe affair. We will be able to, and need to, reach-out from our homes to the world.

Forecast #27: Just as the office at home is already a reality, the classroom at home will be a supplement to formal school classrooms. The media room at home will be the growth center for adults and children alike.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #28: Consortium of computer companies decides to put PCs in front of every school child. This initiates a greatly increased use of computers in school. New discoveries about learning result and networks expand.

Forecast #28: Learning (computer based) becomes a national (and global) network-based process. Cross boundary fertilization of education and educational ideas, i.e. U.S.-Japan interchange.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Having remarked upon the enclosed forecasts, you may have additional comments which you would like to add. Feel free to expand upon missing educational futures or on educational specifications (architectural considerations) which you feel could not be adequately discussed within this survey. These comments will be shared with the other participants in round two of the survey.

Please return this survey by
July 10, 1993.

Your participation, vision and expertise has greatly enhanced its success.

Thank you.

Appendix H

Round Four Survey Instrument

Round Three Survey Results

Architectural Programming
For
Educational Futures

Round Two

New Franklin R-1 School District

"A Recognized School of Excellence"
United States Department of Education

August 1993

August 4, 1993

Dear Colleague:

Thank you for completing the round one survey on architectural programming for educational futures. The responses to the various forecasts were very insightful and comprehensive. Due to the exceptional nature of many of the responses, I have elected to change the format of the survey slightly, which should result in stronger data and a smaller committment of your valuable time.

In this second round survey, you will recieve a compilation of all of the responses from the fifteen participants in the study. I ask that you read these responses at your leisure and then make any additions to your first round response or comment upon another participants response. Each of the responses is numbered with a respondent-question number such as 5-22. The first number is the respondent number. All of your responses will begin with the number _____.

Research has shown that reading the responses of others often assists participants in brainstorming higher level concepts or ideas. Should you read the responses for a specific forecast and wish not to make additional comments then please leave that question blank. You are not obligated to write new responses for all (or any) of the forecasts. Upon completion of the survey, please return it in the enclosed, postage paid envelope. Please return the second round survey by **August 28, 1993**.

Many of you noted a clerical error made on my part and not picked up during proofreading (though proofed by three people). Scenario #23 was listed twice as both #23 and #25. As you complete this survey you will note that scenario #25 has been changed to include the appropriate scenario and forecast.

In the next (and final) survey round, you will not recieve the responses of any of the participants but only a series of short "thematic characteristics" based upon qualitative analysis of the group's responses to the foecasats. You will be asked to rate each characteristic on a six point Likert scale as to probability of occurrence and years to widespread acceptance. Round three should require a minimal amount of time for completion.

I have been reminded by some of the participants that the results of this study should not be considered a panacea for the programming of future school facilities. Facility programming should not be done in isolation of the local school personnell, community members or site constraints. Other participants noted that the results of this study could serve as a very useful start from which local school personell and architects (in light of local constraints and resources) could consider their own future facilities. This "useful start" is how I wish the results to be percieved and utilized.

I hope you will find this survey enjoyable and informative. Again, my thanks.

Sincerely,

Kelvin L. McMillin

SAMPLE ROUND TWO

Having read the first round responses to forecast #1, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

SAMPLE ROUND THREE

SAMPLE THEME: School facilities, particularly elememntary schools, will become community schools with governmental or social agencies housed under the same roof as classrooms. This may be accomplished through combination of shared areas (cafeterias) and discrete usage areas (offices). This will necessitate the school being accessible up to 16 hours a day and year-round. Student security may require dual entrances to service agenicies (one to the outside and one into the educational facility) which can be locked or "zoned" during certain portions of the day.

Please rate the probability of the above forecast becoming widespread:

- ☐ Highly probable. Will unquestionably occur.
- ☐ Probable. A strong possibility that it will occur.
- ☐ Somewhat probable. A weak possibility that it will occur.
- ☐ Somewhat improbable. A weak possibility that it will not occur.
- ☐ Improbable. A strong possibility that it will not occur.
- ☐ Highly improbable. Will unquestionably not occur.

Time:

The above future prediction will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Scenario #1: Large scale employers are increasingly seeing the need to teach remedial and/or specialized occupational skills to their employees. U.S. employers spend $210 billion annually on training of the national work force, an increase of over 70% between 1985 and 1988. Also rising is the number of companies sponsoring English educational programs to immigrant workers. In the near future, it is predicted that immigrants will fill more than one-fifth of all new jobs in the United States.

Forecast #1: Over half of all large companies (10,000+ workers) will offer some means of formal or informal education for their employees in the future.

1-1 Future school facilities will be designed for early morning and evening use in teaching remedial and occupational skills required for employment. Generic classrooms flanked by generous storage rooms will permit use by "shifts" of students and teachers. Flexible, technologically advanced loft spaces will permit companies to create their own idealized training facilities. Child-care and food service facilities will be available for workers attending classes. Administrative spaces will accommodate a variety of programs. The cost of housing and operating these programs will be borne by public-private consortia. Satellite and fiber optic networks may link company classrooms with those in schools for work-day courses.

2-1 Future school facilities will be integrated into the communities around in a way that will foster cooperation with a wide array of institutions from museums to business and industry. Education will be perceived as a life-long enterprise integrated throughout ones life experiences.

3-1 The school will function for at least 16 hours a day. Off time will be utilized for adult education and for special programs facilities for extended family use, i.e. baby sitting, social services, etc. must be included in the typical school.

4-1 They will be decentralized. Rather than large hospital- or jail-like edifices designed to segregate young people from the real world, there will be small learning environments located in work places of all kinds with students of all ages learning from each other and teaching each other. The costs will be shared between the public and private sectors.

5-1 There will be more students receiving bi-lingual and ESL (English as a second language) services in future years. The necessity of providing specialized space will push up the number of square feet needed per person. Also new space will be needed in Spec. Ed. as a large percentage of these youngsters utilize that program.

6-1 The hard-line between "education" and "work" will soften. Students will visit workplaces; adults will visit schools. Adult education (continuing education) will occur in many places, including high schools and neighborhood elementary and middle schools.

7-1 No effect on building.

8-1 Inconsequential. Our vision of the future would suggest the learning community concept which would suggest that the educational programming and the architectural response should present and encourage flexibility and adaptability for change.

(continued)

9-1 More cooperation will occur between the schools and the business communities. Schools will serve under contract to train and retrain employees. This will meet rethinking, lighting, zoning of facilities, furnishing, etc. Also, industry could open facilities for occupational training minimizing the need for "vocational" facilities at the school.

10-1 Inconsequential

11-1 We will need to eliminate the "school house" as the sole "educational specification" and redefine all the learning activities, places, and spaces -- which can easily and quickly change. "Schooling" will be only one important part of "learning." Interactive technology will also place learning in the home, the school, business and industry and other "learning" spaces. "Educational specifications" developed (solely) by local and parochial school groups does and can cause obsolete "school buildings".

12-1 Future school facilities will use business/industry sites for instruction during non-school traditional hours, or school instruction will be provided through on job site methods utilizing school/business partnerships.

13-1 Schools will need to be designed to allow them to function on evenings and weekends for adult education programs. This would, more than likely, require segregation of the facilities in such a way that portions of the building could be "opened up" without opening up the entire building, while making sure that all the necessary services are available.

14-1 I understand that schools are suppose to do more than simply prepare people to make a living. They are suppose to prepare people to live full lives--to participate in their communities, to raise families, and to enjoy the leisure that is the fruit of their labor. A solid education is suppose to be its own reqard, but that is not happening. Maybe that old saying "education is wasted on the young" is true. If learning is a life long event, maybe we should have a narrow work-focused education first than let them get the liberal education in later years. For most of this century, as this nation took its goods and know-how to the world, America did not have to worry about competition from abroad. At home, the technology of mass production emphasized discipline to the assembly line. Today, the demand on business and workers are different. Firms must meet world class standards and so must workers. Employers seek adaptability and the ability to learn and collaborate in teams (could be on-line teams). My suggestion is a curriculum of the future that will be designed around job specifications. Every job (like the Navy) will have a job classification and one must take a course or pass a test that will qualify you for that job. These courses will be developed around virtual reality so every aspect of the job will be simulated before you actually have to perform the tasks evolved on the job. One may challenge the qualifying test or take the course with the competency test being the culminating activity. The educational specifications of the school facility will be a 10' by 10', interactive, self-contained (wheels, chemical toilet, solar electrical) TeleModular Unit (SC-TMU), capable of global electronic information access and global collaboration, connected by satellite to the National Resources in Education Network (NREN). This mobile unit can be taken anywhere one wants to learn. It can double as an office as the student moves into the job market. He will use this SC-TMU form cradle to grave.

(continued)

15-1 Businesses and industries in large measure do not really teach what schools have not done or the students have not learned. They teach specifics related to their operations. Much of what they teach comes under the category of "How to do your job" and "How to represent our company or business." Granted their jobs could be easier if parents and youth did their jobs while youth were in school. Company programs may not have any impact upon school buildings unless the schools have taken on an adult education program. The schools programs are the ones that should influence the facilities.

Having read the first round responses to forecast #1, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #2: The growth of an urban, minority underclass is likely to occur as the birth rate among families with less than a $10,000 yearly income will double that of families with a $30,000 or more yearly income. Single parent households continue to be the fastest growing family unit, particularly households headed by male single parents. Immigration is now America's greatest source of population growth.

Forecast #2: A greater proportion of tomorrow's students will enter school with one or more "strikes" against them.. These "strikes" may include poverty or lower family income, a single parent household, or a minority heritage with parents of a below-average educational level.

1-2 Schools will have diagnostic counseling centers to assist in placing parents and students in appropriate remedial and job training programs. Social service agencies will be located in the schools for greater accessibility to the public. Classes in household budgeting and nutrition will be conducted.

2-2 Schools will be year round; it will continue (and may even increase) social services such as health checks, luncheons and extracurricular activities. There will also be increased collaboration between the schools and parents of every ilk - traditional, single, step and combinations thereof. There will need to be more health-oriented and community-oriented facilities - more meeting rooms, work-out facilities, etc.

3-2 The school must become the "house" for all of the social service agencies including medical, dental, psychological, social, food services, etc. The typical school will have to be larger and provide more specialized spaces in addition to the classrooms.

4-2 My response to forecast #1 continues to be relevant to this forecast. "Workers" will be expected to "teach" as part of their "jobs" and child care needs will be met in these new learning environments. The extended family and the one-room schoolhouse will be re-established in the learning communities. School cafeterias will be replaced by civilized dining facilities where families share their cultural heritages and learn to create the best of American culture. Housing arrangements also become connected to schooling for many more people than is the current practice.

5-2 The number of at risk kids is growing dramatically. Elementary schools will have to be designed to accommodate more community use. Role of schools will be changed to be a catalyst for social change.

6-2 The definition and perception of schools will change from "schoolhouse" to "community learning center." It will be open more hours, more months of the year, more days of the week - to serve a broader spectrum of people.

7-2 Buildings must accommodate pre schoolers.

8-2 In terms of this forecast if the schools serve this need would to require educational specifications especially for at-risk children and for full-day, full-time kindergartners.

(continued)

9-2 The school will have to be more "home like" with private places for study. Cafeterias will become "human". Is there a possibility that some school will become boarding schools, as we did for the American Indian?

10-2 Schools must serve children at an earlier age and must provide them with care all day long. Therefore, early education facilities must be a part of school planning as should facilities for the care (and feeding) of children from at least 6 a.m. to 6 p.m. To the extent that regular rooms are going to be used "after school" storage facilities must be provided to safeguard both the school materials and those used after school.

11-2 This increasingly diverse populations will mandate increased number of value and need options and choices -- within and outside of public educations. To the degree that we (educators) continue to plan "the" single choice school we are obsolete, unwanted, unneeded and irrelevant. Most of the "options" and "choices" however are value choices -- not socio-economic-ethnic differences. The real battle is between the Hamiltonian (elitist) value choice: "Give them a test, keep the best, and discard the rest" and the Jeffersonia (individualized, personalized, common cove of learner outcomes and increased options) school.

12-2 School will incorporate day care facilities into the school facility and community agencies will be housed on school premises.

13-2 Schools will have to be designed to include daycare facilities. This will allow single parents to work while their children are in school. There will be a necessity to do more "teaming" of classes to include the minority and below-average student with higher-average students. The brighter students can assist the minority or below-average student in the educational process; i.e., the brighter students will be able to assist the teachers educate other students in this "teaming" process.

14-2 The educational specifications of the classroom of the future will be a 10X10 foot, Self-Contained, TeleModular Unit (SC-TMU) with virtual reality telecommunication capabilities that can be transported any where at any time. It will be mass produced with standardized parts. Because these students may include poverty or lower family income, a single parent household, or minority heritage with parents of a below-average educational level, there must be many ways to acquire an SC-TMU. Students will be able to buy, lease, rent or borrow these units with most of the money being subsidized from federal or state governments or private lending institutions. State educational vouchers could be used over a 10 year period to pay for these units. Businesses could lease these units back to employees over a long period of time. To get a job in the future you will have to show competencies in navigating a SC-TMU.

15-2 Who is to be responsible for early childhood experiences before kindergarten? The community needs to define this or turn it over to some other agency by design or default.

(continued)

Having read the first round responses to forecast #2, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #3: Advancements in computer hardware and software have made the educational use of computers more viable. Software developers have made significant progress in diagnosing individual student educational needs, matching appropriate educational instruction to these needs and tracking student progress.

Forecast #3: Computer technology will become an integral part in the diagnosis of student needs, the development of prescriptive instruction, and the monitoring of student progress.

1-3 Lighting and acoustics must be designed to accommodate this technology. A distance learning center will be connected to homes via fiber-optic cables to enable most learning to occur at home

2-3 It already is!

3-3 The electrical/electronic capacity to permit a wide range of computers/interactive hardware, telecommunication devices and other, as yet unforeseen, devices to operate. The range of technology is limitless and we must provide the space in which to utilize it.

4-3 The "library" as a school space will disappear. Families will have access through telephone/television/computer connections that are decentralized, demystified and culturally friendly to the past of which libraries have heretofore been the prime repository. There will still be books, but these will also be available in a decentralized manner. Building implications are primarily in redesigning for smaller units and multiple locations needing hook-ups to allow access to the world through technology. The forecast is misguided in its view of technology as big brother or teacher/counselor, no matter how benevolent. As the extended family is recreated, human contact for students will expand and the computer will be a small factor in diagnosis, prescription or monitoring. It will be large for access to information, access to other human beings in distant places, and access to an individual's creativity. It's power must be decentralized and equitably distributed with any "school" and among "schools!"

5-3 Networked laptop computers. Also more multimedia stations. Key here is to put them in classrooms not away in computer labs.

6-3 The school will learn a lot from the modern office building which enjoys a high degree of flexibility - with movable partitions - with electrical and communications changeability - allowing programs and spaces to change and evolve.

7-3 Adequate technology facilities. Telecommunications (video, audio, motion, CD ROM, videodisk) should be commonplace.

8-3 All new facilities should be planned for maximum use of technology. This includes administrative, diagnostic and learning needs. Computers are but one of many technological tools available to expedite the process. Educational facility planning and the architectural response should permit or plan for extensive use of the ever-changing technology.

(continued)

9-3 This forecast is with us. We will no longer have "computer labs" at the junior-senior high school levels. The computer will be part of classroom just as a chalkboard is now. "Classrooms" could be smaller or larger depending on the hardware development.

10-3 Teachers must have space in which to work. Support personnel must have adequate office space. Children must have spaces in which to work as individuals and where they can get extra support and help (staffing, not facilities).

11-3 The problem is not in hardware and transmission. Those problems are being solved. The problems are: 1) "Junk" software 2) antiquated "educational specifications" 3) Unprepared teachers and administrators 4) systems design 5) maintenance 6) costs.

12-3 No effect since education cannot afford financially the computer technology in terms of keeping it state-of-the art. Sorry to be pessimistic.

13-3 Schools will need to have the capabilities of networking all computers throughout the school system into any location within each facility so that diagnosis, development, and monitoring of student progress can be done readily and easily.

14-3 The curriculum for each student will be designed by telecomputer counselors, after taking a through analysis of where they are from where they want to go. This prescription service will come from an interactive educational video channel brought in to the SC-TMU by satellite or the local cable corporation or by interactive computer telecommunications. The California State University system through its Project DELTA is digitizing most of their degree programs. I believe K-12 will not be far behind. Complete learning/testing will come through the interactive computer/video network. When I was in the Navy, every job as analyzed. A training package was designed for each job as well as a qualifying test to give you the rating necessary to do the job. This system is coming to our children in time. The New York systems of Regency tests is a precursor of this system. The educational specifications of the classroom of the future will be a 10x10 foot Self-Contained, TeleModular Unit (SC-TMU) with virtual reality telecommunication capabilities that can be transported any where at any time. It will be mass produced with standardized parts. Students will be able to buy, lease, rent or borrow these units with most of the money coming from the federal and state governments or private institutions. To get a job in the future you will have to show competencies in navigating a SC-TMU.

15-3 In this instance, it seems to me that the cart if before the horse. This scenario suggests that computers have caused diagnosis, instruction, or monitoring. The progress in educational instruction and learning methodologies ought to be the driving force. Computers can be the agency to assist tremendously in these processes. Unless seen in this light, computers will be like many of the aids that were purchased during the Johnson administration and, in some cases, are still gathering dust in some remote storage.

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Having read the first round responses to forecast #3, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

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Scenario #4: There is a growing mismatch between the literacy level (vocabulary, reading and writing skills) of high school graduates and the competencies required by the jobs available. By the year 2000, three-fourths of new work force entrants will be qualified for only 40% of the jobs available. As a result, many industries are asking schools to produce graduates who can not only read and write but also have competencies in problem solving, communications and computers.

Forecast #4: Businesses will increasingly demand greater skills of high school graduates in problem solving, communications and computer literacy.

1-4 Schools will provide "activity laboratories" in which teams of students will learn to address and solve a variety of problems originated by industry. A variety of communications tasks will be associated with each problem, as will the use of a variety of "high-tech" equipment including computers. Students will understand the application of the skills they are acquiring, not just the abstract theory.

2-4 I believe business will bow to the realities of how information is treated, stored and retrieved in our modern day world. That is, they will use more dynamic GUI requiring reduced reading. High schools will certainly increase emphasis on problem solving, communications and computer literacy. They will also, however, develop new "media" literacy courses in which they will teach the use of TV, computers etc. in information communication and interpretation. Reading and writing will remain important but no more than two components in the broader subject of media literacy. An increased number of media classrooms, i.e. classrooms with multiple media environments available, will be found in most schools.

3-4 Inconsequential.

4-4 See previous response (Forecast #3).

5-4 Larger classrooms allowing more use and training in technology needed for private sector employment.

6-4 Students learn in different ways. A broader range of learning environments is needed to accommodate different ways of learning. The "standard classroom", repeated dozens of times, will yield to a variety of spaces.

7-4 The building is only the shell for this to occur. However the building should accommodate faculty development.

8-4 Rather than a massive change in the physical environment for learning, the need is for a change in the curriculum content and the methodologies to deliver this content. Inconsequential

9-4 There will be need for a longer school day and a longer school year -- not 45-15, but a longer year for the program. Advanced students can opt for individualized study (vocations); other students will continue on task at the school facility or by linkage to the home.

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10-4 At all levels, children must be encouraged to work in groups, to tackle and solve problems. This means having spaces where groups of children can work (and even yell) without disturbing other groups of children or individuals. This also suggest that schools (particularly high schools and middle schools) must have spaces where children can learn to communicate using a variety of mediums -- television, acting, music, art, etc. The cookbook approach to music and art, in particular, has no future particularly at the upper grade levels.

11-4 The above scenario (in my judgement) is "bull shit". If so, why are so many of our companies moving their factories south and to Asia in order to get cheap-uneducated, and unskilled labor. We should (increasingly demand) greater support of businesses in the reformation of public education. A few enlightened companies have joined with public education in this reformation.

12-4 See forecast #1.

13-4 To accomplish the need for an increasing demand for problem-solving skills, communication skills, and computer literacy, it will necessitate the educational process to be set up more on an interdisciplinary arrangement. This allows the courses and program materials that are presented to the students to be more practical and relate to actual problem-solving. I see this developing into teams, or maybe "schools within-a-school," where all disciplines are taught in one group, making it a problem-solving type course, rather than individualized, departmental courses.

14-4 When I was in the Navy, every job was analyzed. A training package was designed for each job as well as a qualifying test to give you the rating necessary to do the job. This system is coming to our children in time. The New York systems of Regency tests is a precursor of this system. The educational specifications of the classroom of the future will be a 10x10 foot Self-Contained, TeleModular Unit (SC-TMU) with virtual reality telecommunication capabilities that can be transported any where at any time. It will be mass produced with standardized parts. Students will be able to buy, lease, rent or borrow these units with most of the money coming from the federal and state governments or private institutions. To get a job in the future you will have to show competencies in navigating a SC-TMU.

15-4 It does not appear that this scenario and number 5 have implications for facilities except as time required for instruction may require more of the types of facilities that are generally envisioned. That is, if the program which involves the topics envisioned are a part of existing programs, there will be no change or minimal change in requirements. On the other hand, If dealing with this feature requires greater time commitment, then additional facilities are likely to be required of the type characterized as academic facilities.

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Having read the first round responses to forecast #4, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #5: Social and environmental issues are increasingly becoming public concerns. Issues such as drugs, AIDS, the "greenhouse effect", and the destruction of the rainforest are becoming a focus of national and international policy.

Forecast #5: There will be an increase in public attention to social and environmental issues.

1-5 Schools will be designed to consume virtually no energy from off-site. Parking space will be allocated only to electric vehicles and recharging stations (metered) will be provided. A variety of ecology learning facilities will be in the design including the building itself. The health of all living organisms will be the primary focus of the building environment. Individual and group responsibility for the physical world will be promoted by requiring that the building and grounds be maintained by the students and the community. Landscape will consist of plant materials that require little water and no mowing... gasoline powered lawnmowers will no longer be permitted.

2-5 A world wide recession is likely to increase compromise between the environmentally concerned public and the various special interests of business. The long-term trend will have business building social and environmental remedies into their operating structures. Rather than more buildings for education, business and schools will collaborate to have students come to the work environment and observe firsthand what is being done/not done to protect the environment.

3-5 Inconsequential.

4-5 The newspaper of today will not exist. Through access as discussed in response to forecast #3, everyone will be made aware of current issues and also current attempts to find solutions through the decentralized system of technology. Through interactive connections, students of all ages will be able to participate in developing and implementing possible solutions.

5-5 Likely science programs will become more sophisticated with greenhouses, outdoor classrooms and world wide computer linkages.

6-5 The school will expand its mission - from teaching a bracket age group to helping create a better community.

7-5 Schools will need to foster global art and music. Emphasis on working together thus options for small group activities.

8-5 If any impact, the emphasis should be upon a more sensitive physical environment upon individual needs. Inconsequential

9-5 Districts or consortiums will develop environmental learning centers. Why not social learning centers?

10-5 Would that it were true. No effect on facilities unless schools have to establish barricades in order to keep out the "no-nothings" who think talking about issues (and values) is tantamount to sinning.

11-5 Flexibility

12-5 Inconsequential.

13-5 The environmental issue is one that should be translated into buildings that are responsive to the environment and fit into the surroundings, but are also energy conservative in their design, as well as taking into account new means of energy sources, such as solar and geothemal, as well as ice storage, etc.

14-5 The curriculum of the future will come in part from problems in the community and the textbook of the future will be the connectivity to the vast databases found on the global electronic information networks. Therefore the educational specifications of the class room of the future will be a 10x10 foot Self-Contained, TeleModular Unit (SC-TMU) with virtual reality telecommunication capabilities that can be transported any where at any time. It will be mass produced with standardized parts. Students will be able to buy, lease, rent or borrow these units with most of the money coming from the federal and state governments or private institutions. To get a job in the future you will have to show competencies in navigating a SC-TMU.

15-5 No response.

Having read the first round responses to forecast #5, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #6: The U.S. population will increasingly reflect minority groups. The U.S. population growth will become increasingly dependent upon legal and illegal immigration. Within a decade, one in every three students will come from a minority background. At some point in the future, the "majority" population will consist of groups of "minorities". Today's majority white population will become tomorrow's minority.

Forecast #6: Future curriculum content will address the issue of diverse cultural values and languages. School personnel will utilize teaching strategies that stress appreciation, understanding and the value of other cultures.

1-6 Interdependence will be promoted through the development of multi-cultural academic and facility maintenance "teams" that will be provided with their own office and seminar spaces. This will be the primary organizing element of the student body, taking the place of the "home room".

2-6 Pluralism and multicultural studies will certainly become more integrated into the school's curriculum. However there is a growing likelihood that English will be declared the national language of this country and other languages will continue to be studied in limited ways. This scenario is contradictory but no more so than the current situation. There ought to be more language labs and more possibilities for distance exchanges among American and foreign students, but I doubt this will occur. While I think there will be little impact, schools ought to have increased language lab and distance learning facilities. See my response #7.

3-6 Inconsequential.

4-6 Through decentralization of living, working and schooling facilities and the integration of these, and with the power available with technology to undo space and time constraints, the learning environment will provide the curriculum in a natural way. The current fragmentation and separation by economic condition and facility design as well as the "professionalization" of teaching are what necessitate the artificial curricula addressed in this forecast.

5-6 Inconsequential.

6-6 A school usually is, and will continue to be a melting pot. It's a place where people of different backgrounds, of different ability, meet to learn from each other and teach each other. This suggest that tomorrow's school will be a community school.

7-6 Technology capabilities to network with other cultures. Art, decor will be representative of different cultures.

8-6 There may be an impact upon the delivery of multiple languages. The shift will be away from the traditional approaches to a "hands-on" methodology of languages.

9-6 Different ethnic groups react differently to environments. More freedom will be given schools -- including students -- to create friendly environments for learning. Just as a city has its Hispanic, Polish, Black, Asian, etc., neighborhoods the schools will reflect this is decor, pods, etc. Distance learning will become important to bring the world to the school.

10-6 If all the other things suggested (ie a variety of flexible spaces) exist, this will have no impact on space needs.

11-6 Smaller schools, "community school", "support centers", site based leadership, central administration as "support staff", increased options, ending of normative testing as the base for success.

12-6 Inconsequential.

13-6 Inconsequential.

14-6 Therefore, the SC-TMUs will be connected to the global electronic information network like the National Research in Education Network (NREN) and thus to other countries, cultures and languages. The SC-TMUs will be connected by fiber optics and/or satellite/modem networking capabilities.

15-6 The U. S. population has always consisted of a large number of minorities. It is only recently that Spanish speaking populations, for example, have constituted a large percentage of the total. Possibly the impact should be: English as the language of government, for commercial transactions, in the classrooms with considerable emphasis upon a variety of languages besides English and the use of the individual's native tongue to enhance understanding of English.

Having read the first round responses to forecast #6, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

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☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #7: With the break up of the Soviet Union and the unification of Germany, the need for economic strength will far out weigh the need for military might. Moving into the next century, the world economy will be based around three major trading blocs and their trade, economic and diplomatic links. These trading blocs are: Japan and the pacific Rim, the United States and a unified Europe. U.S. exports to Europe and the Pacific Rim will become critical to the economic health of the United States.

Forecast #7: There will be a continued movement toward a globalization of economic markets, communications and finance with an increased foreign ownership of U.S. industries and increased U.S. exports to foreign countries.

1-7 Foreign languages and cultures will be taught in small interactive settings, such as seminar rooms, equipped with CD-ROM or other digital media. Most students will learn to speak Spanish and Chinese as the primary languages used in international trade (in addition to English).

2-7 Distance education linking us not only with other parts of our nation but with other nations will grow significantly in the 21st century. Satellite communications among distant school systems will increase dramatically. In all likelihood school systems will have links with other school systems around the world, and their students will study curricula of interest to all of them as the world continues along the path of becoming a global village. Satellite linkages, distance communication facilities and large facilities holding at least several hundred students participating in both local and distance learning experiences will be needed. Alternatively, every student will have a work station (located in various places) allowing both long distance interaction and on-line learning activities. In an ideal world both of the above possibilities will be implemented more or less simultaneously.

3-7 Inconsequential.

4-7 This will be facilitated by the integration of schooling into the workplace, regardless of ownership. Will there still be the idea of "foreign" countries? Is the concept of economic "markets" viable in a peaceful, global community?

5-7 Inconsequential.

6-7 At first glance one would say "no effect on the design of school facilities", but on further thought, school design will be effected. School planners will exchange ideas worldwide and will learn globally. Some students and some teachers and administrators will travel to other countries as exchange students and world-wide "sister school" visitors.

7-7 This will effect curriculum. For examples, economics, global education will become more predominant. Language facilities, instructional materials (technology, audio, print) available.

8-7 The major impact might be upon a more global technological system of communication for the purpose of understanding other cultures. Inconsequential

9-7 Language classes will increase that not only concentrate on speaking and writing, but on cultural understanding. As we move to a global society, distance learning will become more accepted.

10-7 No particular effect though there may be greater stress on learning languages other than English. Language labs might help, but they'll be built into the computer labs already established in the flexible school.

11-7 I having trouble with the format. You assume the "educational specifications" will write these concepts in. I assume that the "strategic plan" will include all these concepts in it's vision, mission, goals, etc. The educ. specs will be an interactive group process and will not be a big document that nobody reads or understands. The process - product is the key to significant change - not the product.

12-7 The schools need telecommunications capability. They will only be affordable if partnerships with cable companies and phone carriers can be developed.

13-7 This leads to the need to develop curriculums and programs in schools that recognize that we are coming a world economy. We should probably have courses that embrace those issues that make us a world economy. I don't see that it would have any major impact in the actual physical school facility.

14-7 There will be continued movement toward a globalization of economic markets, communications and finance with an increased foreign ownership of U.S. industries and increased U. S. exports to foreign counties. Therefore, Sears & Robot, the producer of the SC-TMUs will become a globalized corporation selling the SC-TMUs all over the world. The SC-TMUs will become more powerful and cheaper to build as time goes on.

15-7 Limited impact.

Having read the first round responses to forecast #7, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #8: As technology becomes more advanced and access to personalized information becomes easier to get, the role of the home may change. Some services which will become more home-based thorough technology are banking, shopping, minor medical (through two-way video and electronic monitoring), education and work (where service sector workers will process information at home and transmit it electronically to the workplace).

Forecast #8: Information technology will blur the barrier between work, school and home, resulting in an indeterminate work/school day.

1-8 Provide a communications center in the school to house the optic fiber switching system and associated recording, playback, FAX, and other electronic equipment to permit all forms of distance learning.

2-8 I think long distance, satellite based facilities will be the major new characteristic of schools. See #7.

3-8 Insure that electronic capacity is provided so that the school/home link up is easily accommodated. Provide a studio for development of program efforts. Provide capacity to retrieve data and transmit it to the appropriate place (home/school/classroom/ etc.)

4-8 See previous responses. The indeterminate day or year will necessitate climate control that many old school buildings were not designed for.

5-8 Computer facilities in schools will link with those in homes of students. In fact in mid-21st century I see regular classrooms to be partially based in the home. Students must have home access to computers in the school. Satellite transmission also.

6-8 When more students spend more time at home and at work the nature of school space changes-
-emphasis on specialized facilities for specialized programs
-large group assembly places
-the resource center/library linked to home and workplace
-social spaces, as dining and recreation and cultural spaces
-more emphasis on counseling, individualized programs, individual schedules.

7-8 Telecommunications capability such that homes, schools, adjunct educational agencies are connected. Learning should be more individualized. Time formats should become more flexible. Smart buildings with open access will be necessary.

8-8 This is another example of the need to implement the "learning community" concept and to provide the communication systems necessary to effectively relate to all elements of the school community.

9-8 As stated before -- long school day, longer school year with facilities planned to serve life-long learning.

10-8 See previous answers concerning the length of the school day. A disaster, however, would be if children did not come to school because they could do everything from home. Socialization is an important aspect of schooling.

11-8 Schools (and ed specs) will need to recognize that technology is and will widen the gap (not close the gap) between our rich and our poor. The rich will have technology at home, the poor will have junk T.V.

12-8 We may see a school day approach that of universities with moderation. Schools may go from 8-3 and 4-7. Students and parents will choose time period to attend.

13-8 This leads to the necessity of having complete network technology within schools, as well as the ability to tie-in to homes through modems, so courses and classes can actually be conducted in the home or any other location in the workplace.

14-8 Therefore, telecommuters don't even have to work at home. They can work out of a satellite office or a telecommuting center where sophisticated equipment is shared by telecommuters from many companies. Why just an office why not classrooms that are designed like offices? The design would be the same and the student would grow up using this telecommuting modular office as a classroom. I can see it now, Sears & Robot mass produces modular tele-office/class rooms. Offices would be standardized with modular plug-in interactive computer/video equipment. What would go into this office would constantly change with the times, but standardization of the space would allow for constant upgrades.

15-8 The impact in this situation is likely to be related to equipment in the resource center so those at home can receive services via modem connections through telephone lines, for example. School spaces are not likely to change unless a very elaborate scheduling arrangement is established to know how many youth will be in the school and at what times. For maximum operation, one could argue for student stations for all unless, the school authorities want to gamble on the percentage of the student body which may wish to be in the building to participate in what kinds of activities. I doubt that that is the kind of gambling that can be afforded within the confines of limited time.

Having read the first round responses to forecast #8, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #9: With the break up of the Soviet Union and the unification of Germany, the need for economic strength will far out weigh the need for military might. Moving into the next century, the world economy will be based around three major trading blocs and their trade, economic and diplomatic links. These trading blocs are Japan and the Pacific Rim, the United States and a unified Europe. Two of the fastest developing industries in these blocs are information technology and biological engineering.

Forecast #9: Economic rather than military strength will determine tomorrow's superpowers, and global leadership in science and technology will determine economic strength.

1-9 Industry equipped and managed labs will be equipped with state-of-the-art science and technology teaching systems based on interactive video and virtual reality.

2-9 See #7.

3-9 Inconsequential.

4-9 Some schools with PE in research facilities. Art will have access through technology.

5-9 Schools must find resources for qualified staff and equipment. Buildings such as in Illinois where 25% were built before 1930 must be replaced.

6-9 Math and science programs will require more sophisticated spaces and those spaces (like research lab spaces) will change as projects change.

7-9 There will be continued emphasis on math and science. Math rooms should be work stations with the opportunity to use technology, manipulatives, and a variety of print options to explore math concepts. Ample storage will be necessary.

8-9 Greater technology capability for analysis and understanding of all scientific study and for communication.

9-9 See scenario #7

10-9 Cookbook science, particularly at the middle and high school levels, will become useless. Children will have to be encouraged to develop their own experiments, their own approaches to problem solving (under guidance, of course). The traditional fixed-space labs should be replaced by flexible space (here we go again), with services that can be tapped into as needed.

11-9 No response

12-9 Inconsequential.

13-9 This leads to the necessity of developing courses and/or labs where there will be a "hands-on" course study in technology and biological engineering and tying these together. This may be a form of group study where students work together in combining the technology and biological engineering information into study work in process.

14-9 Therefore, the curriculum will be designed by educators after taking a through analysis of where you are from where you want to go. The California State University system through its Project DELTA is digitizing most of their degree programs. I believe K-12 will not be far behind. There will be a great need for people with dual major and double degrees--Legal-Bio-Geneticists, Bio-Engineering Lawyers, etc. With virtual reality (simulations) curriculums students will advance faster in their careers and have time for double career fields. The educational specifications of the classroom of the future will be a 10x10 foot Self-Contained, TeleModular Unit (SC-TMU) with virtual reality telecommunication capabilities that can be transported any where at any time. It will be mass produced with standardized parts. Students will be able to buy, lease, rent or borrow these units with most of the money coming from the federal and state governments or private institutions. To get a job in the future you will have to show competencies in navigating a SC-TMU.

15-9 This scenario suggest more science. Will it be chemicals or software programs, in large measure?

Having read the first round responses to forecast #9, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #10: Interactive distance learning, the live two-way interactive use of video technology, will expand the resources of many school systems to include teachers and classrooms of neighboring or far-away districts. Students in one classroom may see and hear teachers/classrooms from other districts and vice-versa. The sharing of resources (teachers) via two-way interactive television will expand the specialized and higher order course offerings of many school districts, particularly small or rural districts.

Forecast #10: Distance learning will be used extensively to bring quality, comprehensive learning experiences to all students.

1-10 Already discussed.

2-10 See #7.

3-10 Provide interactive capacity. Develop transmitting/receiving studio equipped for such activity. Wire every new school to permit such state of the art equipment to be installed. Provide special spaces for such activity.

4-10 See previous responses.

5-10 Yes.- Much more square footage needs to be carved out or built in classrooms.

6-10 The school of the future may be multi-locational in nature, gaining the advantages of facilities at various locations, while retaining the advantages of "face-to-face communication" via distance learning.

7-10 Rooms should be designed to accommodate distance learning. Enough monitors to make a learning classroom above the usual classroom image. Lighting, 2-way video, and quality sound is important.

8-10 This could have major impact upon the physical environment if properly implemented. The educational television concept will not be adequate to implement distance learning programs. It must be inter-active for all students at all times.

9-10 The question will become should we design enriched spaces for the origination and receiving of distance learning, or should each "classroom" have this capability?

10-10 Great, wonderful. And their must be rooms where it can be used by the small or large groups of children involved. But that's already built into the flexible school since distance learning is just another way of using technology. (Again, don't leave the children home -- see scenario 8).

11-10 True. Obviously - design schools for interactive learning - it has finally arrived - after being tried in 1963 - 30 years ago while I was at Michigan State University. Now the software, hardware, and transmission is workable.

12-10 See forecast #7.

13-10 This leads to the need to have incorporated into educational facilities the technology that allows for this interactive, distant learning. This can be accomplished through the use of voice, video, and data systems, incorporated into all teaching station locations, as well as other group areas.

14-10 Therefore, networking capabilities for interactive video and connectivity to all global electronic information, like NREN, will be necessary in this SC-TMU.

15-10 Does this scenario suggest interactive communication laboratories with a host of equipment in communication with related facilities in cooperating schools within appropriate geographic ranges and also specialized program elements with distant (city, nation, hemisphere, globe, space) communication capabilities. Distance learning is more than bringing learning experiences into the school; it requires interaction. The latter may help to overcome the short falls on vouchers with choice which are likely to produce stratified educational experiences rather than having melting pot types of experiences. The actual scenario is much, much broader than the forecast presented.

Having read the first round responses to forecast #10, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #11: Computer networks are by-passing traditional media channels - i.e. bringing the real information to the world from the Chinese student rebellion and from the former Soviet Union. These networks will become more widely used and have a major effect on politics, ecology, environment, economy, etc.

Forecast #11: A more efficient kind of internet will be developed that can be accessed and used easily from any site.

1-11 No response.

2-11 Rather, every student will be issued a computer-based learning center and will be able to stay at home for a large part of her/his education. See #7. Possibly and desirably both of these will occur simultaneously.

3-11 No response.

4-11 See previous responses.

5-11 Same as before. More space in rooms. Self contained room for 30 kids must be at least 1200 square feet.

6-11 The individual student, whether at home, at the school, or out in the community, will be in-the-network. Both individual study and various-size-groups will be encouraged.

7-11 I believe I have covered this.

8-11 Just a more comfortable environment with greater communication capability. Inconsequential.

9-11 Implication: no matter the space, it should be capable of using technology.

10-11 See 10.

11-11 True - your forecasts are excellent. Package them at the front end of your "ed specs" - in fact - forget doing the formal ed. specs and "interact". The school from your forecasts, a strategic plan and an interactive process.

12-11 See forecast #7.

13-11 The advent of the computer networks and media channels makes it necessary to design facilities to allow incorporation of this kind of technology. All school facilities must look to flexibility and adaptability in the development of their specifications so that existing and future programs can be incorporated.

14-11 A more efficient kind of internet will be developed that can be accessed and used easily from any site. Therefore, this 10X10 foot Self-Contained, TeleModular Unit (SC-TMU) will be in big demand throughout the world.

15-11 The needs as suggested by this scenario can be accommodated in the facilities provided by the facilities to accommodate other scenarios provided some agency provides the long distance connections.

Having read the first round responses to forecast #11, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #12: The fact that we are running out of air space for television channels means that as they multiply, they will have to be transmitted through underground wiring, while telephones will be transmitted through air space. The new administration will promote this change through legislation that will effect telephone companies and make it cost effective to run underground fiber.

Forecast #12: Fiber optic networks will link homes throughout the U.S. to business, educational institutions and services, banks, etc.

1-12 No response.

2-12 I would proceed with fiber-optics very slowly since there are already other technologies based on satellite transmission that do not require the relatively very large, up-front investments of fiber-optics and promise greater flexibility. On the other hand it is possible that a large company like AT&T could fund a learning network charging districts for services and earning profits from the services rather than installations.

3-12 No response.

4-12 See previous responses.

5-12 Same as before.

6-12 The telephone will be more important, integrating wired and wireless networks - making voice-video-data resources available to students at any location.

7-12 Telecommunications will change. Schools should be built to accommodate change. High definition TV will be here soon- Fiber at this time, is the best means for transporting distance learning. Partnerships with telephone companies with meetings held at schools. All ages should be coming to school - facilities will have to be considered.

8-12 Same as scenario #11. Inconsequential

9-12 It's already here. The school that does not have a plan for using the future that exists is outmoded.

10-12 See 10. Schools should obviously be tied into all information networks. (And Congress should pass laws making them economically viable).

11-12 Obviously true. Have the educ. specs admit we don't know what's needed - just make everything flexible and easily adaptable.

12-12 See forecast #7.

13-12 This points to the necessity in future school facilities to have the ability to run fiber optics, which must be provided for in the design of the facilities. If it is not installed at this time, it is probably something that will happen in the future.

14-12 Therefore, the 10X10 foot Self-Contained, TeleModular Unit (SC-TMU) will be built for office space as well as for learning space.

15-12 Same response as for 11.

Having read the first round responses to forecast #12, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #13: Dissatisfaction with the quality of education obtained in the traditional neighborhood school has led many parents to pursue alternative means of educating their children.

Forecast #13: There will be a rise in the percentage of students enrolled in alternative schooling programs. These programs will include year-round classrooms, magnet schools in the arts and sciences and the use of home schooling.

1-13 Distance learning labs already discussed will facilitate home schooling; periodic activities at school will enable these students to gain socialization skills.

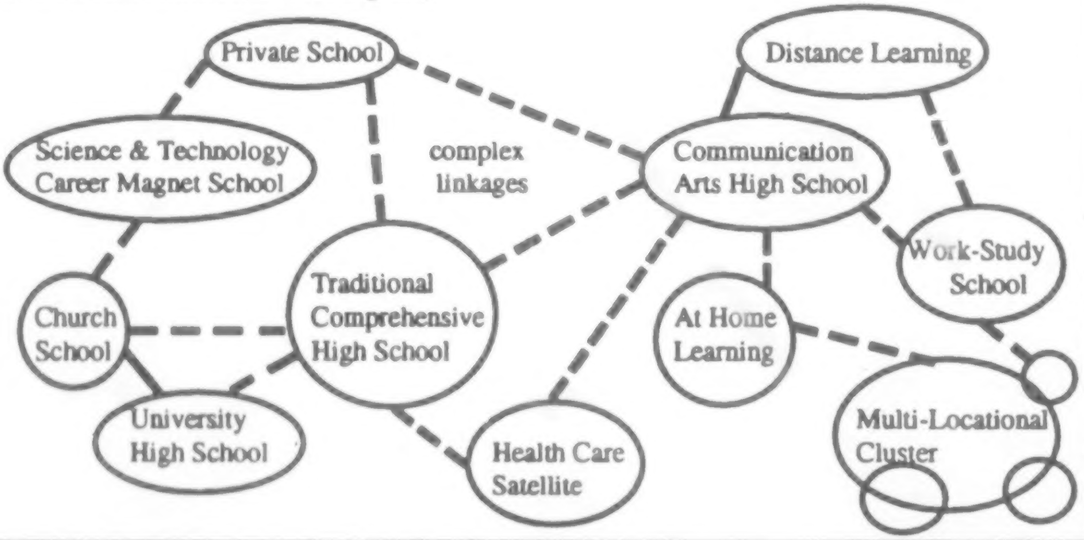
2-13 Continuing my response to #7: The increase in electronic facilities involving large meeting rooms with interactive video facilities will occur and will mean the need for more district facilities for electronic repairs. Possibly the vocational schools will be made responsible for upkeep and ordinary repairs, while central repair centers will deal with more complex repairs and be manned by specialists.

3-13 Develop "in-house" alternatives in each school district. Provision for year round schools suggest air conditioning among their special resources.

4-13 All "schools" will be alternatives to the current "mainstream" idea of school as a place to control the large number of students who really don't want to be there, but for whom we have no jobs. My previous responses give details to my vision.

5-13 If numbers warrant whole different type of school facility must be created which doesn't exist at present.

6-13 Many alternatives will be available, of course, but each school will also be more responsive to changes in demand. Market mechanisms will push-and-pull facilities as community and individual needs change. We'll have large and small schools, public and private, both experimental and fundamental, old and new schools, traditional one location schools and complex multi-locational schools. (See diagram).



7-13 Air conditioned. Science/Math labs. Music Dept. Theatre options (plays etc.). Windows (bring the outside in). Well landscaped.

8-13 This forecast has a mixture of political and moral values. Need to separate the various types of alternative schooling programs.

9-13 Magnet schools will become ore important. There is already a trend for every school to be a magnet. On the other hand, economically we can't reproduce expensive facilities at all sits. As we learn how to tailor our facilities and budgets to serve a diverse clientile, home schooling will become less of an issue.

10-13 Of course. That's part of what we've been talking about. It doesn't matter when children go to school or who uses the buildings. (But watch out for that home schooling!).

11-13 Preempt this strong "force field" fact by having the public schools increase their alternatives, options, and school internal value options.

P. S. A teacher committee - working in isolation won't design these educational options.

P.S.S. A outside "consultant" writing her/his specs (in isolation) will create a creative-innovative school that will be a disaster.

12-13 Facilities for alternative education need more consideration then running them in and unused building. These schools need planning just as new schools need planning. These schools may well account for 50% of our school facilities in the future.

13-13 It behooves the design firm to look at a school facility as a facilitator would look at a school facility. The school must be a good tool in order to allow the educators to utilize the facility to its optimum purpose. This tool then enhances the educational process and makes an exciting working and learning environment for students and teachers.

14-13 Therefore, the 10X10 foot Self-Contained, TeleModular Unit (SC-TMU) will be designed with wheels to be moved anywhere. It can be used at home or taken to a socialization point for alternative type schooling.

15-13 Scenario 13 really needs thinking. If parents were truly involved in neighborhood schools and there were no barriers with regard to locations in which people may live, schools could be very effective. What does alternative means of educating imply?

(continued)

Having read the first round responses to forecast #13, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #14: The number of households in America continues to grow at a faster rate than does the population. The greatest growth in population is occurring in single income, single parent families making less than $10,000 per year. This growth is approaching twice that of double income families making $30,000 or more per year. As poorer families get larger, wealthier families get smaller. One result of this economic and birth inequality is that smaller, wealthier families will be more financially able to afford the newer technologies as they are developed

Forecast #14: Economic differences between double income families and single parent families will increase. One result of this economic inequality will be the development of technological haves and have nots in society.

1-14 "Learning units" consisting of low cost LCD display terminals linked to schools via fiber-optics will be provided to all families as part of a public utility system, similar to the system in France. It will also enable remote diagnosis of many health problems.

2-14 The possibility of issuing every student an electronic home "work center" could alleviate the have/have not learning syndrome this would require developing robust, "knock" resistant stations.

3-14 Provide each school with state of the art technology. Make such equipment available for use on a loan and use basis. Provide every child with his/her own set of technological instruments. For ed specs the capacity to house, utilize, and upgrade such technology is important.

4-14 Through public/private partnerships as described in previous responses, all people will have access through school, work and home which will be integrated for most people.

5-14 Inconsequential.

6-14 The diagram (scenario #13) reminds us that there are many different ways to teach and learn. The new media can be used more effectively to provide learning resources to all students regardless of economic circumstance.

7-14 Room for day care and early childhood education. Separate entrance - medical facilities. Exercise areas.

8-14 The needs will continue to be the same for all. Funding is the issue in this forecast not the learning environment. Inconsequential

9-14 This issue will have to be faced (see scenario #6). Just as we developed a hot lunch program to feed the body, we will develop a lot technology program to feed the mind. With social awareness comes social action.

10-14 Yes. See Kurt Vonnegut's view of the coming world. The schools must try to even the playing field, using all the techniques already discussed and especially early education and all-day programs.

11-14 See previous statements.

12-14 The effect will not be on building per se. The effect will be on the availability of a portable computer for each child.

13-14 Our future educational facilities must provide for the technology and equipment to be available to all students regardless of their economic level.

14-14 Therefore, society will have to come up with a variety of ways to subsidize these SC-TMUs. Our society can not afford the division between two diverse groups of people. All must have access to these SC-TMUs. One idea is these SC-TMUs could be tax deductible for businesses to give to there employees and to less fortunate people. This giving could be encouraged by all forms of governments.

15-14 Isn't this a social problem in the main. The impact upon educational facilities does not seem to be one of great magnitude unless the schools are expected to make up for the inequities of a social order.

Having read the first round responses to forecast #14, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

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☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #15: The agrarian based society is gone. The industrial/manufacturing based society is declining. The prime resources of the future are information and knowledge. Advances in computer technology and micro electronics has led to an explosion in the data processing ability of companies and individuals. This information based economy will prize human intelligence as a major resource, data tailored to the individual as the primary output, and biotechnology as the primary science.

Forecast #15: The United States will continue to move from an industrial based economy to an information based economy where human intelligence, specialized data processing and biological engineering are the key components.

1-15 Already covered.

2-15 In addition to my preceding discussions, I believe greatly improved laboratory facilities will be needed. In particular, laboratories supporting instruction in genetics and environmental studies are especially important. The ability to engage in astronomy studies/work will also be important. School districts could collaborate and in developing and sharing such facilities.

3-15 The capacity to conduct biological engineering classes and appropriate labs for such activity in addition the capacity to house sophisticated computers and interactive television must be considered essential to any new or remodeled facility.

4-15 See previous responses.

5-15 More space for technology.

6-15 The school will look more like an office environment, a library resource, and a research facility - as the line between "learning" and "working" blurs.

7-15 Schools should appear/be designed different in terms of the egg crate notion. Movable walls should exist to facilitate changing group structures for learning.

8-15 No question about the changes taking place as we have moved into the information society. The communication capability need will increase with time and the information processing capability will be necessary to keep pace. Inconsequential

9-15 This is debatable. Of course, we'll react. But there will be a trend to combat the impersonal robot society. In education, the pendulum always goes too far one way or the other (remember the open plan). There will be an effort to put technology into perspective.

10-15 Which should change curriculum, but my flexible facilities will be able to meet the challenge.

11-15 The only hope for continued world wide leadership by the U.S. is to recognize and create an "information age society" our educ. specs (or process) need to create totally new schools: 1) curriculum 2) instruction 3) philosophy 4) strategy 5) preparation-induction-"renewal" programs for teachers.

12-15 Inconsequential.

13-15 This leads to the need for future school facilities to have accessibility to major sources of database information, allowing all school systems to "tap into" mammoth sources of information for any and all coursework. The schools must have this capability linked to each individual computer or classroom space.

14-15 The United States will continue to move from an industrial based economy to an information based economy where human intelligence, specialized data processing and biological engineering are the key components. Therefore, learning and working in a self-contained, TeleModular Unit (SC-TMU) is imperative if global electronic information center will be the way to collaborate and communicate globally. These SC-TMUs used from "cradle to grave" will be as important as automobiles are in the Western states.

15-15 This scenario's implications for facilities is related to the quantity of facilities required for most of the other social issue scenarios.

Having read the first round responses to forecast #15, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #16: Economic forces continue to provide the impetus for the design/ development of highly interactive and well designed educational software. The software will be available to, and purchased by, educators as well as the general public (perhaps through interactive on-line services.

Forecast #16: Continually increasing use of powerful information technologies in formal schooling (as well as in more informal settings) will force the redefinition of the roles of building administrators, teachers and learners.

1-16 Many school personnel will serve as counselors or advisors to students in planning their preferred education objectives. Others will conduct socialization activities, few will fill traditional teaching positions.

2-16 Clearly, teachers will need improved office space where they can work with students in distance instructional situations and where the necessary electronic equipment can be stored in such a way as to be easily available. Building administrators will need to be electronic/media specialists. See #7.

3-16 Inconsequential.

4-16 See previous responses.

5-16 Yes- larger spaces for more group and individualized learning.

6-16 Administrators will not only be executives but also facilitators; teachers will also be learners; learners will also be teachers; therefore the ancient dominance of the "classroom" will be challenged.

7-16 Administrator's facilities should be open so that he/she can interact with students and faculty.

8-16 The role changes taking place in education need to be recognized. The industrial society role models will not suffice in schools of the future. All school personnel will take on a facilitator role rather than an authoritarian role. Inconsequential

9-16 The "office" will be an informational source. There will be more spaces for individual teacher "training" and more large spaces for in-service teacher training. We will finally realize this works for the student, too.

10-16 And therefore they will need different kinds of spaces in which to carry out their activities.

11-16 The school building (new or retrofitted) should serve as the "triggering device" for major curriculum and instructional changes. The educ. specs should provide the process for change.

12-16 Not a facility issue as such. It is an organizational issue which may or may not impact facilities.

13-16 School facilities need to be designed so that teachers, administrators, and staff become more of a facilitator rather than a teacher. Information should be readily available to all students through computers. The teachers will need to oversee the use of this material and to assist the learners in that process. This could mean that the typical classroom, as we know it today, will no longer exist. We may have more open spaces in the school facilities, which can be broken up into smaller areas to accommodate smaller numbers of students. Each of these areas may be overseen by a building administrator, so that you might have subprincipals overseeing the separate "houses" within the actual, larger school envelope.

14-16 I disagree. Information Technologies will do away with formal schooling. There will be no buildings to administrate. Teachers will be counselors, coaches, and guides. The saying, "Don't be a sage on the stage, but a guide on the side" will hold true in this future. Learning will be "life long". A career may only last five years, then one must re-tool your skills. Learning will be the essence of life.

15-16 The redefinition needs to be made before the impact upon facilities can be considered. What is the relationship of this scenario to number 10? And, a number of others in the list.

Having read the first round responses to forecast #16, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #17: Educators are increasingly finding it necessary to bring in social agencies of the community to help them solve problems of students. The need for close cooperation between the school and such agencies as the welfare office, social security office, juvenile court, state/county employment offices and other offices has become very evident to educators.

Forecast #17: New elementary schools will be planned and designed as community schools. Existing schools will be expanded to include the community school concept where social agencies are physically located in the school and work closely with school personnel.

1-17 Already discussed.

2-17 See #2.

3-17 Since the school is the typical "common" element in the life of children, efforts to provide spaces that may be utilized for the various myriad of service providers and cooperative agencies is to be considered. This means that the size of the facility will grow and that specialized spaces must be planned.

4-17 I've suggested this in previous responses, but I don't think "elementary schools" will continue to exist apart from other ages or other enterprises.

5-17 This is not new, just a retreat to 1930's.

6-17 The community school will be more thoughtfully integrated with the broader community. It will be an all-day, all-week, all-year center serving both students and all citizens of the community. It will no longer be an 8AM- 4PM "schoolhouse" that is closed at 4PM. Some spaces will be redesigned for young students; some for adults; some for both.

7-17 Schools will need to be made of durable material that is easily cleaned. Constant usage means constant cleaning.

8-17 "Learning communities" involving many governmental and social agencies are the way to go. This concept requires major changes in educational specifications because educational spaces will serve many diversified programs.

9-17 This is occurring. The school must be planned to logically mold all the elements of the community school. More space, more parking, more building, zoning.

10-17 As already programmed. Two problems here -- 1) the reluctance of all agencies (including schools) to give up their independence; 2) security. Children do need to be protected and safe in our crazy society (adults, too), but our concern is for the children. The environment must be secure without being a jail. For example, senior centers might be next to a school -- and seniors might share some of the facilities (see the Park School in Hartford, CT for a wonderful example) but they cannot be in the same place at the same time and adults cannot be permitted to roam through the schools unsupervised.

11-17 For 40 years I have been pushing for new forms of cultural-educational-recreational- human service centers - with limited success. The existing structure of our separate "delivery systems" always subvert this concept. Therefore - change the structure before providing facilities and services for this excellent concept.

12-17 See forecast #2.

13-17 Schools must provide for outside social agencies to have a place in the school systems' facility to visit and work with the students in their different areas. This could mean the need for additional spaces for such programs, or they could be incorporated as a part of the spaces that would be identified as flexible. Their nature of use would require the need for large group instruction areas, so a class or groups of classes can congregate at one time to meet with social, welfare, etc., agencies.

14-17 New elementary schools will be planned and designed as community schools. Existing schools will be expanded to include the community school concept where social agencies are physically located in the school and work closely with school personnel. Just the opposite will happen. Physical location of services will be meaningless. The collaboration of social agencies will be everywhere, networked to the world. Doctors will be able to diagnose on-line. Services of all kinds will be available on the network. This 10X10 foot Self-Contained, TeleModular Unit (SC-TMU) will be the life-line to all collaboration. It will be needed "cradle to grave".

15-17 This one-stop shopping mall approach to educational and social needs is commendable. This arrangement would require cooperation of a host of people to develop an educationally, healthy community in which to live, cooperate, learn, and work - and, possibly retire, but live, cooperate, and learn, too.

Having read the first round responses to forecast #17, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #18: Social demand for education will increase while public expenditure for education will continue to be restricted. Government role will remain limited, but more federal funds may be spent in "matching" local efforts to finance educational innovations and research. Programs that enhance the basic curriculum may be financed through alternative means such as foundations.

Forecast #18: School districts will turn to private donations and foundations to supplement appropriations from local, state and federal governments. These funds will not be meant to replace government funds, but to enhance them.

1-18 Fiber-optic network franchisees may be required to participate in providing "education units" as a part of their monopoly rights in a community.

2-18 Inconsequential.

3-18 Inconsequential.

4-18 No! Public/private partnerships will be the solution to funding and to facilities.

5-18 Inconsequential.

6-18 If you support the "community school" idea- you can reasonably expect supplemental financial support from the broader community services provided. Example: financial support for a community branch library at the school.

7-18 Inconsequential.

8-18 This need does not have major impact upon educational facilities except in terms of their funding. If funding does not exist, we will continue to construct educational facilities on an initial cost rather than a need or long term cost bases. Hence, we will continue to build-in obsolescence. Inconsequential

9-18 Inconsequential.

10-18 If this happens, schools will become like colleges. From a physical facility point of view, that means we'll be building the new Smith gym, the Jones cafeteria and the Rodriquez auditorium when we should be maintaining our existing buildings. Hopefully, if schools do begin getting private funds for construction, they will be able to use them within the context of need, not bowing to the whims of the donors.

11-18 Delimiting the scope of public education - a hard decision. In fact - our federal and state governments are bankrupt. Resource are and will diminish. The issue becomes - what are our priorities and what do we eliminate. The specs need to talk to and face - diminishing resources. Inconsequential. This forecast will have little effect on the design of school facilities.

12-18 Inconsequential.

13-18 The advent of foundations in the school systems has become a very important ingredient in school facilities. They are an important ingredient in funding school programs, but not necessarily facilities. This may create the need for separate areas within school systems that can function as a part of the school facility.

14-18 The government funds will come from an education tax that everyone will pay according to how much money you make, much like social security except you get your benefit at the front end of life not the back end of life. Everyone will be guaranteed an education. Private enterprises and foundations will help fund this national education policy through endowments to the National (World) Education System. The state of national (world) economies will depend on the success of the National (World) Educational System.

15-18 From whence cometh the monies for donations and foundations?

Having read the first round responses to forecast #18, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #19: The U.S. population will continue to grow older as the median age of the population continues to rise. The aging of the "baby boomers", and advances in health care, nutrition and life-style will result in an increase of the proportion of middle aged and older adults in the U.S. population (age 35 and older). These older, mature adults will look to their local schools for continued, personal education and as classroom volunteers.

Forecast #19: Public Schools of the future will be called upon to educate not only students from the traditional ages of 5-17, but also older, even retired, adults. This expanded "adult education" role may include weekend or evening programs.

1-19 Socialization and counseling facilities will be provided for this purpose, but primary delivery of these services will be fiber-optic network.

2-19 See #1, 2, 3 & 7.

3-19 The school must be viewed as the "total" educational unit serving those from age two through the entire life span. Not only must the school be used around the clock, but also the facilities must serve pre-school to geriatric needs. This requires a delicate balancing of needs when developing ed. specs.

4-19 See previous responses.

5-19 Probably districts will have to consider types of "Educational Parks".

6-19 The community school, being 1) a community learning center, 2) a community cultural center and 3) a community recreation center will look and feel more like the community center- with better pedestrian access and links to parks, with better auto access and auto parking, with better night lighting, with some spaces specifically assigned to adult programs.

7-19 Addressed this before.

8-19 Schools should be for education not schooling of a designated age group. This does have a major impact upon the physical environment for learning.

9-19 Add to the above infants, I predict we will take the child at birth and accept responsibility for education until death. We used to have three influences; home, church, school. Only school is left.

10-19 We've already covered this. See particularly scenario 17.

11-19 I believe (because of diminishing fiscal resources) we will need to cut and eliminate many adult education programs and services. A tragic decision.

12-19 See forecast #8

13-19 This means that future school facilities will have to be designed to permit our older populations to use the facilities at night, on weekends, and even during the regular school day. This requires careful consideration of subdivision of the spaces by function so that they can be utilized in off-hours or during regular school hours by adults for special educational programs, as well as physical education-type programs. This may include the need to provide meals to adults and the needy in the school facilities. Again, the facilities have to be designed to allow this to happen without interrupting the normal course of school activities.

14-19 One must understand this new the paradigm of information retrieval. Leaning will be available 24 hours-a-day, on-line, in your 10X10 foot Self-Contained, TeleModular Unit (SC-TMU). This global electronic information center will be networked to the world. Collaboration (team work) on a global scale will be common place. Instead of Public Schools, we will have a National (World) Education Service producing interactive virtual reality learning units on anything one wants to know, from professional competencies, preparing people to make a living, to preparing people to live full lives.

15-19 Many of the scenarios are social scenes for which general education will be required - read, write, compute, think, hypothesize, formulate solutions, and carry through on projected plans for problem resolution.

Having read the first round responses to forecast #19, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #20: Information technology will allow people to have virtual experiences in which they can "go" somewhere and touch, see, hear and possibly smell things as though they were there. They will do this without going anywhere. Virtual reality will inspire students and improve learning.

Forecast #20: "Virtual reality" will become a tool for teaching, particularly geography, history, science and someday math.

1-20 Already discussed.

2-20 A virtual lab facility is certainly desirable and will become increasingly important. However, other facilities are higher in importance on my list. See my response #15.

3-20 Capacity to handle such "virtual reality" is important. Because it has not yet been defined - providing for such development is at best risky. Proving conduit to permit addition of specialized wiring is probably the best hedge against such development.

4-20 See previous responses.

5-20 No response.

6-20 May be an important buzzword. May lead to other concepts The lesson for facility design is: "programs and equipment will change. The school must be designed to accommodate unknown future needs, not just current needs."

7-20 Again, technology (multimedia) capabilities should be easily accessed by traditional learners and teachers as well as non-traditional participants.

8-20 This forecast requires or suggest interdisciplinary instruction which may require different groupings for participants and a different level of sophistication of the physical environment. The educational specifications and the architectural response should reflect this need.

9-20 Even Doonsebury knew this is here. How and where we use this virtual reality has yet to be determined.

10-20 Already covered. Isn't technology a wonderful tool! But it's still the same tool and it needs the same kinds of spaces.

11-20 Our entire curriculum and instruction needs major revisions to recognize this fact. Teacher/administrator preparation and induction programs are obsolete. If the above is truce - focus on that and not design school buildings based upon obsolete assumptions.

12--20 Maybe. A long way to go with this concept to make it applicable to school age children in a school setting.

13-20 Future school facilities will have to accommodate the technology and equipment that will make it possible for students to touch, see, hear, and possibly smell things as though they were somewhere else. I would see this requiring special facility spaces within the school facility to accommodate this kind of function.

14-20 Computers make learning fun. Students learn by doing, and computers provide hands-on, interactive projects. Computers provide a rich and compelling place to explore. While students are exploring, they are learning. There is so much information in our student's world, and the only ones who will become successful are those who can navigate through this vast information and make sense out of it. Virtual computer systems, or virtual environments, will immerse the user in three-dimensional, computer-generated worlds and allow him or her to control the computer by wearing a special helmet and gloves. The 10X10 foot Self-Contained, TeleModular Unit (SC-TMU) will have to have the technologies to immerse into this reality. Some of what is needed now is a thin lycra glove that has optical fiber sensors detects how the user's hand is moving and allows interaction with objects in the simulated world. The helmet contains a small television screen for each eye sot that the image appears to be three-dimensional. A sensor on the helmet tells the computer when the user's head moves and the image changes accordingly. The helmet also prevents the user form seeing anything except the image. As time goes on this will all be miniaturized. There is room for all aspects of Virtual Reality, ranging from serious business uses to game uses to counter-culture uses. Because virtual environments are not limited to what humans can experience, they will allow student to feel the experiences of other life forms or objects. An example within the realm of possibility would be to experience like as a molecule mixing with other molecules. Doctors may soon use virtual reality models to enter a patient's brain and plot tricky laser surgery on tumors previously inoperable. Hollywood can now create "virtual" actors and sets that look real but are actually cyberspace constructs (The new "Terminator II: Judgment Day" uses these tricks). Virtual reality will supplement or replace "desktop" metaphor in which data from planetary spacecraft are treated two-dimensionally, like a stack of business documents. Instead, virtual reality will introduce the "exploration" metaphor, in which the student is immersed in the far-away environment like a geologist on a field trip. This will all be done from your 10X10 foot Self-Contained, TeleModular Unit (SC-TMU).

15-20 Same comment as for number 19, and, possibly, the accommodations required in regard to many of the other scenarios, too.

Having read the first round responses to forecast #20, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #21: Increasing numbers of states are facing crises with respect to funding public education. Several states' funding formulas have been determined unconstitutional or are under pressure due to tax caps and or concerns about inequality. Continually increasing costs of education combined with a shift in population demographics (aging, increased percentage of minorities, etc.) will force changes in how public education is funded.

Forecast #21: Inequities in funding of public schools will receive increasing levels of public attention resulting in court ordered restructuring of educational finances. This may include a shift from local to state (from private property tax formulas to sales or income tax formulas).

1-21 Schools may become community resource and counseling centers with little classroom instruction. Civic and socialization activities will be housed/conducted, but most actual learning will be via electronics.

2-21 An adequately implemented "distance education/home learning center/school-based large meetings for further discussions" format will by its very nature - i.e. electronic equivalency of facilities - equalize the distribution of education regardless of taxing modes.

3-21 Important but facilities will still be needed.

4-21 See previous responses.

5-21 States will have to consider taking away local funding of school facilities. The state needs to insure quality facilities.

6-21 Funding sources (like programs) change from decade-to-decade. Buildings, however, can serve for hundreds of years, if designed for change. This suggests the need for high quality buildings for education which can readily adapt to new needs.

7-21 Future facilities will be expensive. Winning public support will be difficult. Perhaps a long range plan with shorter goals to accomplish.

8-21 This calls for a review of funding for all purposes and the establishment of priorities. Inconsequential.

9-21 The result con be better schools or poorer schools. If the "powers" will pay less attention to square foot per child and more to proper environment for learning, better schools will result. As funding moves more to the state or federal level, we have a challenge.

10-21 Has nothing to do specifically with the characteristics of facilities though it may make it possible for some of the poorer districts to improve.

11-21 These "shifts" will not generate any new monies. They will just level the "playing field" to average and reduce the number of innovative - light house schools.

12-21 It will have impact only if a court ruling like the Supreme Court of Texas ruling requires facility equity as well as financial equity.

13-21 Inconsequential.

14-21 I agree completely. Creative financing will have to come to the National (World) Education System. I advocate an Education Tax from cradle to grave. Much like the Social Security Tax that pays in the beginning not the end. Everyone should be guaranteed an education to their fullest potential.

15-21 This is a fundamental problem. Too many of us have forgotten the sacrifices that our forefathers make and are not willing to make 1993 sacrifices of equal magnitude but of a different type. The impact upon facilities if monies are found would be to pay for what the demands that good educational planning would dictate.

Having read the first round responses to forecast #21, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #22: Within the next twenty years, many corporations are expected to trim their management hierarchies to half of their current levels. These corporations will be moving towards a more efficient management style of "networking", where lower level employees will operate more independently with increased decision-making responsibilities. Some operations previously handled "in- house" will be networked via technology to specialists outside or across the corporation. Small firms providing highly specialized services will fill in the gaps left by these restructured large firms.

Forecast #22: Through computer technology and networking, small companies will be able to compete successfully with large firms. Networks or management teams will replace management hierarchies in most corporations.

1-22 Educational activities will be conducted in similar ways, so that every child has access to an equal educational opportunity.

2-22 See #1,2, 4,5,7,11,12, & 13.

3-22 Suggest greater emphasis on cooperative learning. Schools to become centers for networking and retraining.

4-22 See previous responses.

5-22 Inconsequential.

6-22 Students too (like small companies) will benefit from computer technology and networking. See diagram for scenario #13. Many small groups of students (almost like schools-with-in-a-school) can be served by the network, growing, shifting, re-developing, changing.

7-22 Adult classes available. Alternative time periods to accommodate the non traditional student.

8-22 Similar to a previous scenario, changing roles and understanding of the change is the important issue. Inconsequential

9-22 Inconsequential.

10-22 Has nothing to do with facilities. The group work discussed earlier will provide students with the training and education needed to succeed.

11-22 The same scenario will hit the public schools - in fact it is here. The concept of the principal as the "curriculum leader" is obsolete. Teams of "peer" teachers as curriculum planners and decision makers require spaces and places.

12-22 Inconsequential.

13-22 Based on this, there could be a necessity to retain/reeducate many people in the workforce. This again would require the use of school facilities for more than the normal student age level (for adults), and would closely relate to the answer given for scenario #19.

14-22 Through computer technology and networking, small companies will be able to compete successfully with large firms. Networks or management teams will replace management hierarchies in most corporations. This will make Sears & Robot able to manufacture the Self-Contained, TeleModular Unit very cheaply. Robots will take the place of workers while top management will be monitoring the whole process using virtual reality. This could be a one man Company, my robots and me.

15-22 Does this scenario refer to the situation after formal education and life long learning is in operation? If not, then there are limited school building implications.

Having read the first round responses to forecast #22, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #23: Recognition that environment (school buildings) affects learning is growing rapidly. New advances in technology/information retrieval is changing the design of learning spaces. Teaching methodology in all curriculum areas is being dramatically changed through the use of new technology.

Forecast #23: The relationship between learning, technology and physical facilities will play a major role in restructuring education and the planning of new schools.

1-23 Cheerful, "high touch" environments will humanize the "high tech" learning systems. Nature will be brought into every space possible, as will natural light (or its artificial equivalent in terms of spectrum) for the health and psychological benefits that they support.

2-23 See #7,13,14,15,16,20, & 21.

3-23 Suggests heightened capacity to accommodate technology. Schools will need far greater electrical capacity and be able to have each child linked by computers.

4-23 See previous responses. Even "curriculum areas" will change.

5-23 Much research needs to be done on reaction of students to design elements, heat, cooling, light etc.

6-23 We will recognize the importance of lessons learned from the design of office buildings, shopping centers, research laboratories and universities. Tomorrow's school will provide a broad variety of learning environments. Technology will influence design, but so will broader human needs.

7-23 This has been my theme throughout the survey. Buildings will have to be designed to be able to easily update the electrical/computer/multimedia changes. Schools will need to be flexibly designed to function year round. Adequate space to meet the many diverse learning needs of students.

8-23 "Form follows Function". Education needs to be restructured and once this direction is clear, the appropriate physical environment will follow. We have entirely too many examples of failure where the facilities were used to force program changes.

9-23 As we make more use of technology, we will attempt to "humanize" the environment so we don't end up in an H. G. Wells world.

10-23 That's what this is all about. What else is there to say?

11-23 The "educational specs" (if utilized) should serve as the "tool" (triggering device) for curriculum and instructional and philosophical change or keep planning your "cell block" schools based upon a totally different set of philosophical and learning assumptions.

12-23 I believe your forecast to be true. The impact on the future will be school restructuring. Aslo the existing schools will have to be introfitted touse the new technology. We may see a heavier demand or retrofitting them four new schools.

13-23 It must be recognized that the school facility makes a major impact on the learning process. By designing an excellent facility with spaces that excite and "turn on" kids you provide the catalyst to make the education process enjoyable and a desired experience. Good educational facilities that get everyone who participates in the learning process excited are necessary to make the learning process a stimulating experience. The harmonious combination of the learning technology and physical facilities must take place in all new school facilities. The envioronment of the school buildings must allow for these functions to occur without taking away from the learning process.

14-23 The relationship between learning, technology and physical facilities will play a major role in restructuring education and the planning of new schools. Make the paradigm shift please! No new schools. Location in the future of learning is meaningless. We won't go to school, school will come to us. School in the context means information. The 10X10 foot Self-Contained, TeleModular Unit (SC-TMU) is a tool that links students to a vast network of knowledge that includes data, text, sounds and pictures. Learning to tap that tool--even exploit it for all it's worth--should be the primary education task of this decade. Foresighted teachers realize they cannot be the gatekeepers of knowledge, dispensing information on the same schedule, year after year. Teach children how to find information and you teach a skill that leads to a lifelong ability to tap the world's expanding knowledge base. Remember the old proverb "Give me a fish and I eat today, teach me to fish and I eat forever".

15-23 It is a little hard to comprehend what this scenario suggests unless it is the accumulation of all the other applicable scenarios. I wonder if this forecast is stated backwards or is just somewhat convoluted? However, the relationships between effective instruction and learning will determine the nature of education and the nature of education should dictate the characteristics of the facilities to house the programs.

Having read the first round responses to forecast #23, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #24: In the future the organizational structure of schools will be called into question. Time-based promotion, age-graded classrooms and Carnegie units will be considered a less efficient educational structure. The needs of individual students will be seen as more important than traditional grouping practices.

Forecast #24: In the future, promotion between grade levels and graduation will be based upon the individual mastery of educational concepts and not by age. Students will be expected to exhibit mastery of pre-specified outcomes prior to promotion or graduation.

1-24 Computerized instruction will be the key to making such a system work.

2-24 Inconsequential.

3-24 Suggests spaces that are modifiable are important, work spaces that can be reconfigured as needs change are called for. Individual carols, seminar spaces and large group spaces might be needed.

4-24 See previous responses! "Grade levels" will no longer be a part of the school culture.

5-24 Larger spaces to handle multiple learning levels in classrooms.

6-24 Might this suggest re-appraisal of the "educational park" concept with k-12 students at one site (in contrast to the common practice of separating ages into K-4, 5-8, 9-12 schools?) An eighth grader could take some classes with high school students; a fifth grader could help teach younger students.

7-24 Open rooms for the movement of students from different learning tasks or needs. Content and not age will dominate the curriculum. Old, young, etc. will share the same classroom. Chairs, table, fountains, visual centers will need to vary to meet the diverse needs.

8-24 Undoubtedly the forecast is accurate, but it is not clear what changes will be made. Inconsequential.

9-24 There will be more spaces for individualized or small group learning. This will be especially true in lower income areas.

10-24 Yes, yes, yes. And that demands flexible space so that children can work as individuals and as groups and be grouped and regrouped as needed.

11-24 The most significant action we could take in our planning would be to eliminate the "Carnegie unit" without doing that you are just "dinking around". Secondly carefully plan "cooperative learning" in our specs.

12-24 This forecast will result in more individualized learning area rather than large classrooms. A central learning core may become the depository of educational materials with connectivity to every room in the school and home in the community.

13-24 The fact that the organization's structure, as we traditionally know it, will disappear. Our school facilities must be designed with flexibility to allow for students to move through programs at their rate, rather than on any grade level rates. This means that schools must be able to function with students moving at different rates and levels.

14-24 Let me add--prior to promotion, graduation or jobs. Unless all of us work to turn our educational system around, our your people, and those who employ them, will pay a very high price. Low skills lead to low wages and low profits. Many of our youths today will never be able to earn a decent living. Good jobs depend on people who can put knowledge to work. New workers must be creative and responsible problem solvers and have the skills and attitudes on which employers can build. Traditional jobs are changing and new jobs are created everyday. High paying but unskilled jobs are disappearing. Employers and employees share the belief that all workplaces must "work smarter". I understand that schools are suppose to do more than simply prepare people to make a living. They are suppose to prepare people to live full lives--to participate in their communities, to raise families, and to enjoy the leisure that is the fruit of their labor. A solid education is suppose to be it's own reward. Are schools doing that now under the existing system?

15-24 What educational changes will be required? Those need to be defined before the implications for facilities can be proposed. If moving at one's own pace would suggest that a higher percentage of children would take longer to complete their desired tasks and if more children would continue on through high school graduation, then, one could assume that more of nearly all facilities would be needed unless year around schools, longer school days, or other space saving devices were incorporated.

Having read the first round responses to forecast #24, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #25: Volunteering will become increasingly important in society as the population grows, money shrinks and the need for support of social service agencies increases.

Forecast #25: Volunteering, off-campus programs, learning in the community, helping others, tutoring, working/studying in social agencies and hospitals, et al. will dramatically increase in the coming years.

Based upon this forecast, what characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #26: In a recent Roper Organization poll, AIDS, crime and drug abuse were the issues listed about which Americans were the most concerned. One of these, drug abuse, has many educators worried. Children born to mothers who are drug users, particularly the drug "crack", are more likely to be born with physical impairments than are children of non-drug using mothers, and are several times more likely to be socially, emotionally or intellectually delayed. These children, who will often exhibit multiple disorders, will have special educational needs.

Forecast #26: The problems exhibited by children born to drug addicted mothers will cause educators to alter the approaches they utilize in educating children. New definitions for achievement may result and categories of special education may be expanded.

1-26 I am not able to offer opinions on this issue.

2-26 I really do not agree with the forecast. I think mainstreaming of all kinds will persist.

3-26 Spaces designed to accomodate these special children.

4-26 See previous responses. In a decentralized, family approach to learning all students will be "special." Research on "crack babies" has been questioned.

5-26 Special inclusion calls for about 60 square feet per special ed. student who is not LD.

6-26 The community school might be designed to offer students closer association with more people in the community - people who are good citizens, family people, people with different occupations, professionals, construction people etc.- a broad variety of role models.

7-26 This one leaves me blank. There are philisophical issues that would first need to be agreed upon.

8-26 What will these be and what about the mainstreaming issue? Inconsequential

9-26 Need for special education space for physcially and emotionally distrubed will continue to grow. This will require more space in every school if we accept mainstream. Estimate: 10 to 15 percent more space.

10-26 No specific facilities effect if the previous approach to schooling (all day, all-life, flexible spaces, flexible learning patterns, use of various technologies) is available.

11-26 Our failed social policies is generation a huge new way of children and youth with SEVERE special physical and emotional needs. Planning needs to recognize this fact.

12-26 Inconsequential.

13-26 Future school facilities must be designed to allow a combination of all special education students and levels. This could mean restructuring the physical facility to allow for these kinds of changes. Again, this leads to the need to be flexible in the building design, as well as adaptable for future change.

14-26 Just like the old, those who can not take care of themselves will have to be put in homes with very expensive support staff. The average home for old people, now is $3,000/ month. These children will have to supported by the state until we find a way to make parents support this drain on society. My 10X10 foot Self-Contained, TeleModular Unit (SC-TMU) will not help those who can not learn.

15-26 True, but what? The program suggests that there will have to be much more hands on medical, diagnostic, and educational experiences with individual and small groups, the use of many more types of educational devices and equipment, and monitors. All of this suggests the need for a host of small spaces for individual or small groups to function effectively in a learning community of caring people.

Having read the first round responses to forecast #26, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #27: Information and communication technology at the global scale and differences in time zones will make global communication an around the clock around the globe affair. We will be able to, and need to, reach-out from our homes to the world.

Forecast #27: Just as the office at home is already a reality, the classroom at home will be a supplement to formal school classrooms. The media room at home will be the growth center for adults and children alike.

1-27 Already addressed. Educational media must be percieved as more important than Miami Vice, and perhaps as exciting.

2-27 See 7,11 and 21. Also #13.

3-27 Inconsequential.

4-27 See previous responses.

5-27 No response.

6-27 If the home becomes more important for learning, the school still has important functions as meeting place, social place, educating center for specific age groups but also for all people, and for specialized labs and classrooms, gym and pool, resource center, TV studio, etc.

7-27 Again this forecast is true because of the technology available and the need to provide for re-tooling adults to be productive.

8-27 Another example of a change of the communication system. Inconsequential.

9-27 Most children will not have a "media room" at home. This is why the longer school day and year will result.

10-27 If this happened to a great extent it would be a shame. Children would learn isolated in their homes with no contact with other humans. Back to the 12th Century. We already have too many people who spend thier time alone at home with their technology (TV and VCR). Don't build smaller schools and suggest that children stay home more often; it would be a disaster.

11-27 The "classroom at home" will only be a reality for upper and upper middle income families. What about the poor and lower middle income? What little they recieve will be largely at the school. We need give away-take home-low cost library materials for the poor. To partially compensate for the widening (learning) gap between the rich and poor and technology.

12-27 Technology access to school learning centers will be a necessity.

13-27 School facility needs are similar to what was mentioned prevously. We must allow for the school facility to be a resource and to be able to "tie-in" through a modem and fiber optics to each home.

14-27 You have made the paradigm shift! But, the home will be more than the supplement of formal school classroom, it will be the formal global electronic learning/information center. Andrew Carnegie said "the library was the poor persons university". I believe the SC-TMU will be every persons university.

15-27 This scenario implies equipment to make the projected communications a reality. How does the school staff coordinate the multitude of educational experiences which one can envision to provide each child with an educational culture with some sense of fiber. Possibly more shredded wheat.

Having read the first round responses to forecast #27, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #28: Consortium of computer companies decides to put PCs in front of every school child. This initiates a greatly increased use of computers in school. New discoveries about learning result and networks expand.

Forecast #28: Learning (computer based) becomes a national (and global) network-based process. Cross boundary fertilization of education and educational ideas, i.e. U.S.-Japan interchange.

1-28 Most P.C.s will have low-energy-use liquid crystal displays, not CRT's, minimizing the need for large electrical circuits and increased A/C to remove heat, and reducing the concern for lighting and window reflections. Computer/video projectors will be widely used for instruction.

2-28 Large areas dedicated to satellite and other electronic facilities. Numerous previous responses address this.

3-28 Capacity to handle them.

4-28 See previous responses.

5-28 No response.

6-28 If the computer is portable and notebook sized, it is used on a desk (like books, magazines, paper reports, photos, other equipment) and therefore easily used in a number of situations - with other media - with small groups, large groups or individuals. Therefore good design is the product of thoughtful consideration of human needs (not just computer needs) - good lighting, acoustics, views, air, colors and textures, comfortable seating and varied environments.

7-28 The same technology issue.

8-28 May increase the amount space necessary to porvide individualized work and learning spaces.

9-28 Inconsequential.

10-28 Wonderful. My flexible school will handle this technological development, too. The problem won't be the facilities -- it may be the teachers. They're going to have to be a lot better than they are now. More flexible.

11-28 Providing computors free is a good business decision for the producers. Selling the software and maintaining the technology is beyond the financial resources of most school districts. Recognize these operating costs in your planning.

12-28 See forecast #7.

13-28 School facilities that have computers in front of every child will need to have increased space for the computers themselves. We have found that the normal classroom space allocation per student is not adequate when computers are added to this requirement. This could be a changing requirement in the fact that as technology advances, computer sizes and space requirements may diminish.

14-28 I believe the "new world order" (United Nations) will probably see the importance of an educated world population. The global electronic information systems will naturally become the classrooms of the future. Everybody will be networking the world--people, corporations, communities, and nations. The Futurist, July-August, 1993, in an article titled "Networking the World," discusses this question. "The emergence of networks of nations is upon us. This vision of the future sees multiple international integrates into the global whole and yet remains an independent entity and substantially self-reliant." This is the "holographic" concept. The authors end with this statements. "Networking solves problems in a way that contributes to the metasolution of global "problematique." It enables people to work together better. We are one planet and many networks--the organizations of the future at work today" (Lipnack & Stamps 1993, 10). "The difficulties not in the acceptance of new ideas, but in the letting go of the old" (Gatlett 1988).

15-28 This suggests larger spaces of many types since student stations will have to be much larger to accommodate all the needs that this scenario implies unless miniaturized equipment with capability of large operationally effective equipment becomes a reality. There will be no time for second chances with limited windows and the disturbances of equipment failure.

Having read the first round responses to forecast #28, what additional characteristics (educational specifications) will future school facilities have in order to optimally house the educational program?

☐ Inconsequential. This forecast will have no effect on the design of school facilities.

Additional comments from round one participants:

9-29 In my work, clients are beginning to question the design of classrooms and the library. We are in an era of change, technology is moving faster than those of us not directly involved can comprehend. The challenge is to realize we must design for technology, but not at the expense of the arts. There is more to learn from reading Les Miserables than there is from watching the movie.

12-29 The forecast are fine but one must still be aware of the reluctance of governing agencies and parents to allow facility innovation as projected through the forecasts. Unfortunately, that obstacle is not addressed specifically in the forecasts. Ideally, schools as we now know them will not exist in the future. Realistically, society may keep schools from changing.

Additional comments you would like to add:

Please return this survey by
August 28, 1993.

Your participation, vision and expertise has greatly enhanced its success.

Thank you.

Appendix I

Round Four Survey Results

Architectural Programming
For
Educational Futures

Round Two Results

New Franklin R-1 School District

"A Recognized School of Excellence"
United States Department of Education

September 1993

Scenario #1: Large scale employers are increasingly seeing the need to teach remedial and/or specialized occupational skills to their employees. U.S. employers spend $210 billion annually on training of the national work force, an increase of over 70% between 1985 and 1988. Also rising is the number of companies sponsoring English educational programs to immigrant workers. In the near future, it is predicted that immigrants will fill more than one-fifth of all new jobs in the United States.

Forecast #1: Over half of all large companies (10,000+ workers) will offer some means of formal or informal education for their employees in the future.

4-2-1 I think they will need to be MORE FLEXIBLE * - "school" will be located in many sites and will serve even more purposes then is currently the case. While I believe distance learning including computer-based instruction will continue to grow, the large - group, class - like meeting will also continue to be important though possible diminishing 25-30 years from now. * Movable walls - variously equipped rooms, different kinds of sites (museums, business, etc.)

4-3-1 The school will function for at least 16 hours a day. Off time will be utilized for adult education and for special programs facilities for extended family use, i. e. baby sitting, social services, etc. must be included in the typical school. They will be decentralized. Rather than large hospital- or jail-like edifices designed to segregate young people from the real world, there will be small learning environments located in work places of all kinds with students of all ages learning from each other and teaching each other. The cost will be shared between the public and private sectors.

4-4-1 "School" will disappear as an edifice. Large companies, if they continue to exist, will have few human employees. Learning communities will be small, interage, entrepreneurial. In the transition stage, some old school buildings might have to be shared by a number of these communities until they can create and fund the environment they want. There appears to be a goodly amount of agreement among respondents to the scenario.

4-5-1 Very simple. Schools will have to move spaces. Multiple usage necessitates larger and more flexible spaces.

4-6-1 No response.

4-8-1 I am not sure that large companies will really do as much as is suggested. I do not believe that they think that things that are being done or products that are being manufactured can be done or made better. Hence, why educate our employees. Of course, if they took Deming seriously as countries in the Pacific basis have done, they may make a change. However, based upon the assumption that the 50% segment "of large companies will offer some means of formal or informal education for their employees in the future" I believe that if they do they will provide educational programs for their employees specifically related to jobs in which they are involved or will be involved. I do not envision that this fact alone will have an

(continued)

impact upon K-12 educational programs unless large companies contract with schools to provide that training. I do not expect such contracting to develop, however. I can envision some public school teachers being employed on a part time basis by large companies to teach some classes for them. But such programs may be for the short term as the companies crank up their own programs. As feed back comes from the large companies, I can envision some changes in K-12 programs. Most of those changes are likely to relate to the quality of K-12 offerings and not extensive program changes. All of these company programs which are envisioned, I believe could have an impact upon K-12 education which may parallel or go beyond the expressed need to improve K-12 education.

4-9-1 It appears there is some agreement that the "traditional" school day and school year is being challenged. The school will become the community education center.

4-10-1 Respondent 1 has a vision of what could be, but the public will not pay to create school space for industry. Only if industry puts up construction dollars for public schools will this occur. I still believe scenario #1 to be inconsequential. This forecast will have no effect on the design of school facilities.

4-11-1 Future school facilities will need to be located in multiple places and sites: the work place, the home, and the school. They also need to be interconnected.

4-12-1 The line between business work places and school setting will continue to blur as both sectors find it in their best interest to share facilities.

4-13-1 I agree with 3, 5, and 11. Do not agree with #14.

4-14-1 Future school facilities will no be geographically housed in any one place. The educational program will be accessed from where ever you want to learn.

4-15-1 Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #2: The growth of an urban, minority underclass is likely to occur as the birth rate among families with less than a $10,000 yearly income will double that of families with a $30,000 or more yearly income. Single parent households continue to be the fastest growing family unit, particularly households headed by male single parents. Immigration is now America's greatest source of population growth.

Forecast #2: A greater proportion of tomorrow's students will enter school with one or more "strikes" against them. These "strikes" may include poverty or lower family income, a single parent household, or a minority heritage with parents of a below-average educational level.

4-2-2 Our understanding of the nature of family is already changing and will continue to do so. Family will consist of many role players who today are considered “non-traditional”. Schools will increase their roles as family “members”. Lunch rooms, rooms for meetings, extra-recreational activities, day-care rooms for children of teen-age parents, etc. I may not agree with this trend, but it is clearly the trend.

4-3-2 The school must become the “house” for all of the social service agencies including medical, dental, psychological, social, food services, etc. The typical school will have to be larger and provide more specialized spaces in addition to the classrooms. School will incorporate day care facilities into the school facility and community

4-4-2 Perhaps the wording of the scenario has caused respondents to back off somewhat from the more positive suggestions in #1, the integration of home, school, work, and agency support that most of us predicted in #1 will make much of this scenario meaningless.

4-5-2 More special spaces psychologists, social workers, social agency personnel, more space per small group conferences.

4-6-2 The “community learning center” will serve not only “traditional” students of a certain age, but also their parents.

4-8-2 I agree that the schools, especially at the elementary school level are likely to become community center, one-stop centers, to which families are likely to go to obtain all the services that are needed of a social service nature. I don't believe that they will be grocery, clothing, hardware, and related stores. I think those are likely to continue in a mode not too far different from the present sources. Certainly these school/community centers are likely to provide for those families that need them a host of experiences like the best of nuclear families have traditionally provided in the past - nurturing, feeding, reading, teaching, valuing, etc. In essence, having the young ones ready to learn when they enter school. That position suggests the need for facilities in the schools that will house the envisioned programs for the young children. In addition, the school/community will need spaces to provide the social service needs referred to earlier. I believe there will be fewer people, proportionally, on welfare but the social service needs will be provided of differing degrees depending upon needs. Spaces to house those activities will need to be provided. I trust that those facilities will be provided by the social

(continued)

service agencies by some join financing arrangements with the schools. This arrangement will permit the single parent as well as others to come to one center to obtain or buy all of the necessities suggested above. A proposal that I monitored was developed by the Saginaw, Michigan, schools 20 or so years ago but was not funded by the Federal government. It seems to take a generation for good ideas to come to the fore when once turned down.

4-9-2 A projection that is already with us is that earlier and earlier childhood education will be offered. Will we (schools) take the child from the hospital and return it (he or she) to the parent at age 20?

4-10-2 No change.

4-11-2 Technology will further widen the knowledge and skills socio-economic gap between the rich and the poor of this nation. Immigration of the poor and "second language" children into the U. S. and our urban centers will again segregate our nation. Schools will need to provide increased options and alternatives - within the public schools.

4-12-2 The remarks for their forecast are remarkably similar except for 14 which repeats response 1.

4-13-2 I agree with 5, 6, 7, 9,10, and 12 - and disagree with #14.

4-14-2 An educational opportunity will be a right - free to whom ever wants to take advantage of it. It will be subsidized with a front-end global educational tax. If you want it and can absorb it, you can have it.

4-15-2 With the increase of early childhood programs the "ed specs" need to address this need.

Scenario #3: Advancements in computer hardware and software have made the educational use of computers more viable. Software developers have made significant progress in diagnosing individual student educational needs, matching appropriate educational instruction to these needs and tracking student progress.

Forecast #3: Computer technology will become an integral part in the diagnosis of student needs, the development of prescriptive instruction, and the monitoring of student progress.

4-2-3 Computers need to be integrated into ALL school facilities for a wide variety of purposes - e.g. in lunchrooms for better nutritional and fiscal management; in gymnasiums for use with improved physical activities and performances; in language classrooms for more individualized activities; in mathematics classrooms; etc.

4-3-3 The electrical/electronic capacity to permit a wide range of computer/interactive hardware, telecommunication devices and other, as yet unforeseen, devices to operate. The range of technology is limitless and we must provide the space in which to utilize it. Teachers must have space in which to work. Support personnel must have adequate office space. Children must have spaces in which to work as individuals and where they can get extra support and help (staffing, not facilities).

4-4-3 Respondent #14 seems a bit out of step with most of the rest of us. It's diagnosis is on the mark, but his prescription is scary!! It further separates and isolates us from each other.

4-5-3 Again space and flexibility. Lighting - ventilation - staff who must be forced if necessary to update technology skills.

4-6-3 We have already integrated computers 'into the schools' learning environments. Now, we can focus on what is to be learned and how learning can be most effective.

4-8-3 The forecast is likely to be true. The implications are that schools will have to change and will be required to generate graduates who have demonstrated by outcomes assessments that they can produce. The implications for school are that teachers will have to become more knowledgeable about what research is suggesting about topics such as effective leaning strategies and knowledgeable teachers are going to have to work with other teachers as faculties in defining what the school need to do in working with boys and girls and parents to achieve the desired outcomes. (The Self-Renewing School by Joyce, Wolf, and Calhoun). The implications for educational specifications will deal primarily with the provisions where teachers will have spaces in which they will be able to review research, study, and plan. They will need spaces where small groups and entire faculties can meet for a variety of activities to learn and plan programs. These requirements suggest, in addition to spaces for students, offices with hosts of equipment, libraries with books, VCRs, etc., meeting rooms, resource materials, support personnel, and time will be needed.

4-9-3 Beware of respondent number 14. This respondent attempts to be specific as to hardware and software. This is dangerous. Respondent number 11 says it well.

4-10-3 No change.

4-11-3 The development of computer software can no longer be left to software technicians. Teachers must be directly involved in the production of appropriate software. Existing software is totally obsolete and must not be "add ons" to the curriculum and instruction program but must be as integrated C & I. For example "hypermedia" will replace existing software.

4-12-3 I still hold to my forecast. Schools will lag behind due to finances. The characteristics listed are in place but they are not state-of-the-art.

4-13-3 I agree with #1, 3, 4, 5, 7, 8, and 9 but disagree with #12 and 14.

4-14-3 My 14-3 statement stand as written.

4-15-3 No response.

Scenario #4: There is a growing mismatch between the literacy level (vocabulary, reading and writing skills) of high school graduates and the competencies required by the jobs available. By the year 2000, three-fourths of new work force entrants will be qualified for only 40% of the jobs available. As a result, many industries are asking schools to produce graduates who can not only read and write but also have competencies in problem solving, communications and computers.

Forecast #4: Businesses will increasingly demand greater skills of high school graduates in problem solving, communications and computer literacy.

4-2-4 See additional comment #3.

4-3-4 Inconsequential. At all levels, children must be encouraged to work in groups, to tackle and solve problems. This means having spaces where groups of children can work (and even yell) without disturbing other groups of children or individuals. This also suggests that schools (particularly high schools and middle schools) must have spaces where children can learn to communicate using a variety of mediums—television, acting, music, art, etc. The cookbook approach to music and art, in particular, has no future particularly at the upper grade levels. Still inconsequential. This forecast will have no effect on the design of school facilities.

4-4-4 OK # 11-4!! Businesses "demanding" will diminish because learning communities will be creating their own means of living, economically and culturally. "Business" as we know it, is as far from successful as "school" or most any other system in our society at this time.

4-5-4 Children will work more in groups and individually. Communication skills must become a required piece of curriculum.

4-6-4 "Schoolhouse" has too often thought of as a group of rigid spaces that do not change. Instead, we can visualize a school where activities change daily and therefore the space and equipment changes daily. When business (or society) needs people with new skills, the school (closely linked to its community) responds with new programs, and new space arrangements.

4-8-4 The forecast is likely to be true. The implications are that schools will have to change and will be required to generate graduates who have demonstrated by outcomes assessments that they can produce. The implications for school are that teachers will have to become more knowledgeable about what research is suggesting about topics such as effective leaning strategies and knowledgeable teachers are going to have to work with other teachers as faculties in defining what the school need to do in working with boys and girls and parents to achieve the desired outcomes. (The Self-Renewing School by Joyce, Wolf, and Calhoun). The implications for educational specifications will deal primarily with the provisions where teachers will have spaces in which they will be able to review research, study, and plan. They will need spaces where small groups and entire faculties can meet for a variety of activities to learn and plan programs. These requirements suggest, in addition to spaces for students, offices with hosts of equipment, libraries with books, VCRs, etc., meting rooms, resource materials, support personnel, and time will be needed.

4-9-4 Beware, again, number 14. I question relying too heavily on the so-called technology laboratory fast replacing more traditional vocational education. When I call a plumber I want a person who knows how to "plumb", not a complete theorist.

4-10-4 No change. (#1 said same thing difficultly as did #13).

4-11-4 Schools will increasingly demand greater support of businesses in providing high school graduates with increased skills in "basic education", problem solving, communications and computers. The home, the school, and the workplace are all equally responsible participants.

4-12-4 No additional forecasts, but my fear is that #11 is correct. Business is outspoken about their needs but does not invest in education. All talk, no action.

4-13-4 I agree with #1 and 10 but disagree with #2, 11 and 14.

4-14-4 The textbook of the future will be NREN. The curriculum of the future will be solving the problems of society. The classroom of the future will be the community. One will access this using the computer.

4-15-4 No response.

Scenario #5: Social and environmental issues are increasingly becoming public concerns. Issues such as drugs, AIDS, the "greenhouse effect", and the destruction of the rainforest are becoming a focus of national and international policy.

Forecast #5: There will be an increase in public attention to social and environmental issues.

4-2-5 Nothing to add.

4-3-5 Inconsequential. This forecast will have no effect on the design of school facilities.

4-4-5 Kids are already showing an environmental conscience. As they network and cooperate through models presented in previous responses, new movements will grow toward a global brain.

4-5-5 Science programs will be integrated with other curriculum such as social skills.

4-6-5 Education will not be "preparation for life," but life itself. Social and environmental issues will be concerns at schools if they are concerns of society.

4-8-5 Public attention to social and environmental issues is likely to increase but at an incremental level until we are really hurting. Hence, the impact upon schools in the main will be limited until the crucial time arrives. Educational specifications could show the need for laboratories related to environmental issues and are likely to have the greatest impact upon facilities for the sciences. The needs will be manifested when we show the impact of undesirable environmental components upon our livelihood. Social issues will require studies with our communities being the laboratories. Certainly, in-school experiences will require expanded resources through a variety of media hence requiring expanded resource facilities and access to information from many sources through communication media in-house and world-wide. Large, flexible-arrangement, well-equipped will be needed.

4-9-5 The problems of school security and ill-prepared graduates will take priority over environmental issues. However, safe - not sick — buildings will be an issue — in fact, already are.

4-10-5 No change.

4-11-5 Increased costs for dealing with mushrooming social and environmental issues; along with diminishing fiscal resources will for schools to narrow (reduce) the scope of its services or invent new forms of teaching and leaning utilizing technology.

4-12-5 Inconsequential. This forecast will have no effect on the design of school facilities.

4-13-5 Generally agree with #1 but disagree with #2 and 14.

4-14-5 Same answer as #4 and 14-5 stands as written.

4-15-5 I'm bothered by #14 consistent SC-TMU response. This gadget approach will not solely solve the educational needs. Schools are constantly adjusting their programs to address contemporary issues. These may or may not impact facilities.

Scenario #6: The U.S. population will increasingly reflect minority groups. The U.S. population growth will become increasingly dependent upon legal and illegal immigration. Within a decade, one in every three students will come from a minority background. At some point in the future, the "majority" population will consist of groups of "minorities." Today's majority white population will become tomorrow's minority.

Forecast #6: Future curriculum content will address the issue of diverse cultural values and languages. School personnel will utilize teaching strategies that stress appreciation, understanding and the value of other cultures.

4-2-6 Increased flexibility in school architecture and room decor would certainly be a means for outreach to a wide range of culturally diverse groups.

4-3-6 Inconsequential. This forecast will have no effect on the design of school facilities.

4-4-6 I wonder if technology could provide instantaneous translation which will obviate the necessity of ever having to learn a language other than your own. What would be the impact of such an eventuality? Culture on the other hand, is unlikely to be fully understood without some kind of immersion; a rich personal experience. Perhaps, technology will homogenize cultures - or even replace them with what Neil Postman calls "technology".

4-5-6 I doubt whether multicultural school curriculum and programs will ever really exist.

4-6-6 Different languages, diverse cultural values, minority groups - can give school spaces character. Instead of "teaching Spanish", a multi-discipline team (including students, community members, and Spanish aides) will provide study of Spanish art & architecture, Spanish food, history, government, literature, and Spanish language.

4-8-6 Forecast #6 reflects a serious problem. If some persons have their way our schools will be set up with centers with each one reflecting one ethnic group's history and contribution to humanity. The trend seems to be away from learning about ethnicity in cooperative ventures and moving toward isolationism. If this forecast becomes reality, schools will have centers in number equal to the numbers of ethnic centers would be equal to the number of ethnic groups which are large enough to gain positions in the sun. Let's hope they aren't the next Bosnia. However, I can envision that display centers and related emphases could be set up for various time periods representing the various ethnic groups. I would assume that efforts toward greater understanding of the various cultures world-wide would require hosts of materials reflecting all that can be acquired dealing with other cultures. It would require opportunities to communicate with other peoples through a variety of media and personal relationships of myriad ways. Human ecology would be greatly expanded to help understand the dress, personal relationships and habits, languages, and food would be examples of things that ought to be studied and experienced. Would there be cooking utensils in every classroom? I doubt it, but there would have to be the potential someplace for such experiences. The facility needs will depend upon the degrees of emphases placed upon the program elements.

4-9-6 We are becoming a multi-lingual society. This will not necessarily effect school design but will curriculum. New Mexico is already a two-language state.

4-10-6 No change.

4-11-6 Reading, language and communication skills will increase in importance and focus.

4-12-6 Inconsequential. This forecast will have no effect on the design of school facilities.

4-13-6 Inconsequential. This forecast will have no effect on the design of school facilities.

4-14-6 Same as answer #4.

4-15-6 May need to restructure the methodology in delivery of languages and in the understanding of cultural differences. "Ed specs" are for the communication purpose of informing the designer how things happen.

Scenario #7: With the break up of the Soviet Union and the unification of Germany, the need for economic strength will far out weigh the need for military might. Moving into the next century, the world economy will be based around three major trading blocs and their trade, economic and diplomatic links. These trading blocs are: Japan and the pacific Rim, the United States and a unified Europe. U.S. exports to Europe and the Pacific Rim will become critical to the economic health of the United States.

Forecast #7: There will be a continued movement toward a globalization of economic markets, communications and finance with an increased foreign ownership of U.S. industries and increased U.S. exports to foreign countries.

4-2-7 Nothing to add.

4-3-7 Inconsequential. This forecast will have no effect on the design of school facilities.

4-4-7 Our ideas are limited by our words, but the respondents generally seem to agree that many of the divisive elements will atrophy and disappear as a result of global technological networks. This will be facilitated by the integration of schooling into the workplace, regardless of ownership. Will there still be the idea of "foreign" countries? Is the concept of economic "markets" viable in a peaceful, global community?

4-5-7 The outside world may finally break through school house doors and textbooks. This will be done electronically.

4-6-7 Globalization will make us more aware of alternative methods of learning - as we communicate with other nations around the world. The Spanish class, studying the agriculture of Spain, today, has direct TV face-to-face linkage to a similar class in Spain, and tomorrow, the emphasis will be on climate - communicating with both Spanish and English.

4-8-7 I agree in general with the statement listed under 2-7. Geography may reenter the curriculum. Just contemplate the host of scenarios that could develop in say social studies classes as students study about globalization, hypothesize about the impacts of globalization, and calculate the social and economic implications of the changes. What a host of cooperative learning experiences could develop. Certainly as has been expressed elsewhere the need for historical resources and up-to-date information would be great. The mechanisms to get that information into the schools would be of large volume. And would have to be provided to gain maximum of learning from the concept of globalization. Impact upon educational specifications? Space to request, receive, and utilize the resources.

4-9-7 It is interesting to note that most respondents indicate that curriculum is and will change, but the impact on facilities will just be new uses for old spaces.

4-10-7 No change.

4-11-7 The current and future "wars" will be increasingly economic wars. Those committing time, talent and resources to a new and improved technological educational system(s) will become the dominant "power" blocks.

4-12-7 While the concept and forecast are viable, I have real problems believing that schools will be financially able to solve/implement these ideas. It will be interesting to see if Michigan by eliminating it's property tax for schools really restructures its system to meet this forecast.

4-13-7 Inconsequential. This forecast will have no effect on the design of school facilities.

4-14-7 The internet now accesses 137 countries. Some 40% of this network is now located outside the U. S. and is expected to grow to more than 50% by 1999. The number of computers on the internet is growing at more than 7% per month and totaled 1.7 million as of 1993. The total number of users is estimated at 17 million and growing. Forecast #7 is correct. My 14-7 stands.

4-15-7 Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #8: As technology becomes more advanced and access to personalized information becomes easier to get, the role of the home may change. Some services which will become more home-based thorough technology are banking, shopping, minor medical (through two-way video and electronic monitoring), education and work (where service sector workers will process information at home and transmit it electronically to the workplace).

Forecast #8: Information technology will blur the barrier between work, school and home, resulting in an indeterminate work/school day.

4-2-8 Nothing to add.

4-3-8 Insure that electronic capacity is provided so that the school/home link up is easily accommodated. Provide a studio for development of program efforts. Provide capacity to retrieve data and transmit it to the appropriate place (home/school/classroom/etc.)

4-4-8 It starts to become redundant in this scenario.

4-5-8 Children will likely attend more days of schools but their days may be subdivided.

4-6-8 No response.

4-8-8 The implications of this forecast seem to rest in the availability of much equipment in three prime areas - the home, the school, the work place. The quantity of these experiences in these various places is difficult to assess. I am sure that it will vary from day-to-day. I anticipate much out-of-school and out-of-the-work-place experiences initially and a drop off as time goes on down to some minimal level which would depend in large part upon the nature of the activity under consideration. Since human beings are social animals in the main, I have trouble envisioning that the need for cooperative, eye-ball-to-eye-ball experiences will be reduced appreciably. I have concern about each ethnic satellite running off on its own.

4-9-8 I refer again to my response 9-8. As stated before—long school days, longer school year with facilities planned to serve life-long learning.

4-10-8 No change — all saying the same things. Schools need to be used all the time, need climate and light control, technological access.

4-11-8 The schools (and school buildings) will be the only hope for economic success and survival of the low and middle income populations.

4-12-8 No additional comments.

4-13-8 I agree with #3 and 7. I support the concept of #10 wholeheartedly where as socialization is an important and essential aspect of schooling.

4-14-8 14-8 stands - educational opportunity will be everywhere.

4-15-8 No change from previous.

Scenario #9: With the break up of the Soviet Union and the unification of Germany, the need for economic strength will far out weigh the need for military might. Moving into the next century, the world economy will be based around three major trading blocs and their trade, economic and diplomatic links. These trading blocs are Japan and the Pacific Rim, the United States and a unified Europe. Two of the fastest developing industries in these blocs are information technology and biological engineering.

Forecast #9: Economic rather than military strength will determine tomorrow's superpowers, and global leadership in science and technology will determine economic strength.

4-2-9 I think #14's response is prediction without taking current social and human circumstances into account. I think human unwillingness to engage as described will interfere. I have nothing to add to my own comments.

4-3-9 Inconsequential. This forecast will have not effect on the design of school facilities.

4-4-9 I doubt I referred to "PE" in my original response, competition between countries will evolve into cooperation on behalf of the planet for space colonization.

4-5-9 Inconsequential.

4-6-9 Science and technology spaces in the school will be supplemented by electronic communications links to university and industry laboratories. However, on some days, students will travel to the laboratories to see scientists and engineers at work - directly - without intervening TV.

4-8-9 Mathematics, science, communication, economics, for example, as we call them today will be somewhat increased, however, there will continue to be demands to retain balance and continued experiences in the arts, music, and related fields. For a period of time, the latter group of experiences is likely to diminish and the desire to provide the former and the necessary additional spaces will influence the content of educational specifications. But, somewhat balanced, quality educational specification writers working with faculty groups will be able to provide what may be considered a good balance among the many components. This condition stresses the need to provide flexible components which may be subject to modification or adjustment as needs change.

4-9-9 Again, see Scenario #7.

4-10-9 No change. #6 is correct as is #13 and #15.

4-11-9 The ability to quickly change and to be easily "retrofitted".

4-12-9 Inconsequential. This forecast will have no effect on the design of school facilities.

4-13-9 Generally agree with #10, not with #14.

4-14-9 See #4 and #5 plus #14-5

4-15-9 Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #10: Interactive distance learning, the live two-way interactive use of video technology, will expand the resources of many school systems to include teachers and classrooms of neighboring or far-away districts. Students in one classroom may see and hear teachers/classrooms from other districts and vice-versa. The sharing of resources (teachers) via two-way interactive television will expand the specialized and higher order course offerings of many school districts, particularly small or rural districts.

Forecast #10: Distance learning will be used extensively to bring quality, comprehensive learning experiences to all students.

4-2-10 Nothing to add.

4-3-10 Provide interactive capacity. Develop transmitting/receiving studio equipped for such activity. Wire every new school to permit such state of the art equipment to be installed. Provide special spaces for such activity. True. Obviously - design schools for interactive learning - it has finally arrived - after being tried in 1963 - 30 years ago while I was at Michigan State University. Now the software, hardware, and transmission is workable.

4-4-10 Space and time will be resources rather than barriers when our thinking responds to our technological possibilities.

4-5-10 Yes. Distance learning will be used more by those districts having resources.

4-6-10 Just as students on a large university campus experience different kinds of spaces, different kinds of people, and different kinds of challenges — so will school students benefit from a broad variety of learning environments.

4-8-10 I have nothing to add to the Round One response.

4-9-10 Schools will have specialized "distance learning rooms" equipped to take advantage of existing and emerging technology. Traditional classrooms will serve as satellite spaces.

4-10-10 No change except that I did not misspell THERE. Your proofreading (see your letter inside front cover) is LOUSY.

4-11-10 The role of the teacher will dramatically change (especially at the high school) from lecturer and dispenser of facts and information to "orchestra leader, intervenor and counselor". This makes virtually all high school teachers obsolete.

4-12-10 No additional comments.

4-13-10 I agree with 3, 5, 7, 8, and 11.

4-14-10 Same as #4.

4-15-10I feel there are too many scenarios related to this topic. Distance learning makes a lot of sense and does have significant impact upon learning. Keep in mind that distance learning is a two-way process, not top down.

Scenario #11: Computer networks are by-passing traditional media channels - i.e. bringing the real information to the world from the Chinese student rebellion and from the former Soviet Union. These networks will become more widely used and have a major effect on politics, ecology, environment, economy, etc.

Forecast #11: A more efficient kind of internet will be developed that can be accessed and used easily from any site.

4-2-11 I agree a more efficient bulletin board system for students, teachers, etc. will be established. BUT this may be locally controlled rather than nationally or internationally-based.

4-3-11 Implication: no matter the space, it should be capable of using technology. The advent of the computer networks and media channels makes it necessary to design facilities to allow incorporation of this kind of technology. All school facilities must look to flexibility and adaptability in the development of their specifications so that existing and future programs can be incorporated.

4-4-11 No response.

4-5-11 Already mentioned.

4-6-11 No response.

4-8-11 No additional comments appear to be in order in response to this forecast.

4-9-11 See answer 9-11. Question answer 5-11. Maybe less space will be needed.

4-10-11 No change.

4-11-11 Your forecast, I believe, totally misses the major point; "internet" is here. It's the garbage software which needs to be redone. Redone to integrate curriculum, instruction, and learner outcomes into a single integrated package; developed by teachers (with technicians assisting) which is flexible, interactive, and comes from clearly defined learner outcomes.

4-12-11 None.

4-13-11 I agree with 5 and 6 but disagree with #14.

4-14-11 See #4.

4-15-11 The technology permits this concept. Unfortunately we do not have enough A/E specialists who understand it and know how to design the accommodating facilities.

Scenario #12: The fact that we are running out of air space for television channels means that as they multiply, they will have to be transmitted through underground wiring, while telephones will be transmitted through air space. The new administration will promote this change through legislation that will effect telephone companies and make it cost effective to run underground fiber.

Forecast #12: Fiber optic networks will link homes throughout the U.S. to business, educational institutions and services, banks, etc.

4-2-12 Nothing to add.

4-3-12 It's already here. The school that does not have a plan for using the future that exists is outmoded.

4-4-12 No response.

4-5-12 Cellular use will develop to the point where many fiber optic programs will be obsolete.

4-6-12 Schools will not be designed for use of a specific technology — as "fiber optics." Instead — as we see in the best modem office buildings — different kinds of technology will be accommodated. Sometimes, books will be the medium. Sometimes, conversation (sitting on a log.) Sometimes, wireless transmission of data.

4-8-12 I have nothing further to add to this forecast. This assumes that at certain levels of schooling or home use, the student will have acquired the skills to use these mechanisms.

4-9-12 Keep answer 11-12 in mind.

4-10-12 No change — 11 says it well; 2 gives a wise warning.

4-11-12 Your forecast #12 is here. Educational facilities will become significantly more complex, expensive to build and to modernize and maintain.

4-12-12 Same as #7.

4-13-12 I agree with #6 and 11 not with #14.

4-14-12 See #4.

4-15-12 This concept has been implemented in many locations for many years. Any educator, planner or designer who has not programmed this forecast is 25 years behind the times. Obviously the "ed specs" should provide the vision.

Scenario #13: Dissatisfaction with the quality of education obtained in the traditional neighborhood school has led many parents to pursue alternative means of educating their children.

Forecast #13: There will be a rise in the percentage of students enrolled in alternative schooling programs. These programs will include year-round classrooms, magnet schools in the arts and sciences and the use of home schooling.

4-2-13 Nothing to add.

4-3-13 Develop "in-house" alternatives in each school district. Provision for year round schools suggest air conditioning among their special resources.

4-4-13 No response.

4-5-13 No. Technology and parental demands will place tremendous pressure on poorly financed private schools.

4-6-13 People, like snowflakes, and fingerprints, are unique one-of-kind creations. Each student needs a tailor-made educational specification. A "house" for 100 students should facilitate 100 individual educational programs. Perhaps the computer will make that ideal possible.

4-8-13 The implications of this forecast are virtually endless. And the numbers of education centers could be great, especially if public monies are available to assist with the development of schools. The implications for public school facilities would tend to be that fewer facilities may be needed. Could there also be implications that the parents who have will choose alternative schools outside the public domain for their children and the children of families with limited means may attend the public schools? If those comments suggest the future reality, it is not clear at this juncture what the implications may be; but there is a tendency for families of limited means having fewer options for post-high-school education for their children. Hence, school experiences which are geared toward preparation for college would be less needed in the schools of tomorrow. But many of these people will see the need to keep their options open.

4-9-13 Number 14 has a one tract (or one cable) mind.

4-10-13 No change - But #14 — the technologist — provides an amusing picture of a seven year old child pushing his 10x10 unit home on its wheels.

4-11-13 Increased number of value based alternatives and options - within the public schools.

4-12-13 I still hold to my forecast.

4-13-13 I agree with #13.

4-14-13 See #1.

4-15-13 Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #14: The number of households in America continues to grow at a faster rate than does the population. The greatest growth in population is occurring in single income, single parent families making less than $10,000 per year. This growth is approaching twice that of double income families making $30,000 or more per year. As poorer families get larger, wealthier families get smaller. One result of this economic and birth inequality is that smaller, wealthier families will be more financially able to afford the newer technologies as they are developed

Forecast #14: Economic differences between double income families and single parent families will increase. One result of this economic inequality will be the development of technological haves and have nots in society.

4-2-14 If any semblance of democratic government is to survive, the schools must help equalize the growing disparities among the rich and poor with regard to access to technology and knowledge/skills about its uses.

4-3-14 Provide each school with state of the art technology. Make such equipment available for use on a loan and use basis. Provide every child with his/her own set of technological instruments. For ed specs the capacity to house, utilize, and upgrade such technology is important.

4-4-14 The public libraries are one manifestation of equal access, the omnipresence of TV is another. It will happen.

4-5-14 Very simple, communities where these children are situated will have technologically inferior schools.

4-6-14 No response.

4-8-14 Comments made concerning Forecast 13 have application to Forecast 14, also.

4-9-14 Some school districts are already facing this challenge. In one big fit, the long-range plan calls for all Junior-Senior High School students to be issued a lap-top computer.

4-10-14 No change. #1-3 suggests a means.

4-11-14 Very true; therefore will public schools and public educational facilities be designed to reduce or increase these increasing economic differences. I hope so but predict they won't be designed to reduce these differences.

4-12-14 No effect on facilities. The effect is on families.

4-13-14 I agree with #10 and 12 not with #14.

4-14-14 No! See answer #2.

4-15-14 Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #15: The agrarian based society is gone. The industrial/manufacturing based society is declining. The prime resources of the future are information and knowledge. Advances in computer technology and micro electronics has led to an explosion in the data processing ability of companies and individuals. This information based economy will prize human intelligence as a major resource, data tailored to the individual as the primary output, and biotechnology as the primary science.

Forecast #15: The United States will continue to move from an industrial based economy to an information based economy where human intelligence, specialized data processing and biological engineering are the key components.

4-2-15 Nothing to add.

4-3-15 The capacity to conduct biological engineering classes and appropriate labs for such activity in addition the capacity to house sophisticated computers and interactive television must be considered essential to any new or remodeled facility.

4-4-15 "Information" isn't the issue. "Meaning" is!! How can we learn "crap detection"? How can we take information, sift through it to find the nuggets we need, and then make it ours?

4-5-15 What previews the information age?

4-6-15 By now, it is apparent that electronic adaptability is important, to readily accommodate both known and unknown future kinds of information systems. However, there is a broader need — to create a good learning environment — with agreeable air, light, views, sounds, etc. Schools can learn something about effective learning environments from the most-thoughtfully-designed office buildings, libraries, and research centers.

4-8-15 Comments made concerning Forecast 4 have application to Forecast 15.

4-9-15 See answer 9-15. I sense a minor "revolt" to turning education over to technology. The need for personal interaction is growing not declining. In some schools there is a counselors corner in the cafeteria. This is a response to letting the student know that a human loves and is interested.

4-10-15 No change.

4-11-15 Current "school buildings" are totally obsolete to adequately respond to the scenario and forecast. More important so are the existing preparation, induction, and inservice programs for teacher and administrators.

4-12-15 Inconsequential. This forecast will have no effect on the design of school facilities.

4-13-15 I agree with #3, 5, 7, 9, and 11 but disagree with #14.

4-14-15 See #4.

4-15-15 This is not a forecast, it is a reality in a majority of schools. There are some agriculture society schools in existence. Unfortunately, we are attempting to provide an information society program in facilities which were designed to house the industrial society program. Hopefully, we will not continue to construct industrial type buildings.

Scenario #16: Economic forces continue to provide the impetus for the design/ development of highly interactive and well designed educational software. The software will be available to, and purchased by, educators as well as the general public (perhaps through interactive on-line services.

Forecast #16: Continually increasing use of powerful information technologies in formal schooling (as well as in more informal settings) will force the redefinition of the roles of building administrators, teachers and learners.

4-2-16 I agree with all the comments suggesting facilitator roles for teachers and administrators. It seems to me, 2, 5, 9, 10, 11, 13 are all getting at the same kind of reconceptualization of architectural facilities.

4-3-16 Inconsequential. This forecast will have no effect on the design of school facilities.

4-4-16 No response.

4-5-16 Schools must have very flexible design.

4-6-16 The "community school" concept is a good idea — not only students of a particular age are served, but also their parents and other community members. People therefore think of the school as their community learning center. Roles change, and the goal changes from creation of a good school, to creation of a good community.

4-8-16 On the basis of some of the reading I have done recently, I have concluded that teachers will have to have time to review research on learning and instruction. They will need to do this so they know the most effective approaches to guide them in their approaches in their roles in the class rooms. This being the case, I believe they will have to be scholars as well as directors of learning. I see the teachers being involved, as one writer indicated, in a variety of experiences with other faculty members in developing the programs for their individual schools in planned relationships with other district schools and the central district staff. They will be doing action research as faculty teams, defining the roles of their school in relation to knowledge gained from their independent leadership teams and study groups so there will be appropriate relationships among the activities in all the schools in the district. This change in the teacher and faculty relationships suggests that the central office role will change to a coordinating role: providing stimulation and providing resources of many types to make the roles of staff members most effective as teachers and as faculties. In the total process of planning with student learning being their uppermost purpose, they will be learning and continually being stimulated by the associations they will have as individuals, as teachers, as faculty members, and as members of a total school district organization. For all of this to come about there will have to be a commitment on the part of all concerned that they wish to truly improve education and not merely jumping on the most recent band wagon which has appeared on the horizon. These changes are likely to require spaces where staff members can work as individuals, in small groups, as total faculties, and many times in groups involving members from various segments of the district. These space needed will have to be appropriately equipped for the process to be most successful.

4-9-16 See 9-16. See 13-16 - I agree.

4-10-16 No change. Let's HOPE #14 is wrong. He would put children in (mobile) isolation cells. That's not education, that's indoctrination.

4-11-16 More of the existing "add on" software - poorly linked to clear "learner outcomes" is a waste. We must throw away and start over. See previous "15".

4-12-16 Still not a facility issue. It is an organizational issue.

4-13-16 I agree with #1, 5, 6, 8 and finally #14.

4-14-16 See #1.

4-15-16 No response.

Scenario #17: Educators are increasingly finding it necessary to bring in social agencies of the community to help them solve problems of students. The need for close cooperation between the school and such agencies as the welfare office, social security office, juvenile court, state/county employment offices and other offices has become very evident to educators.

Forecast #17: New elementary schools will be planned and designed as community schools. Existing schools will be expanded to include the community school concept where social agencies are physically located in the school and work closely with school personnel.

4-2-17 Increased concerns about security will ultimately impact on school design - that is entrances will be fewer and more easily guarded; long hallways will give way to rooms organized around fulcrums, again, so that they may be guarded; metal detectors will be built into all entrances and classroom doorways, etc.

4-3-17 Since the school is the typical "common" element in the life of children, efforts to provide spaces that may be utilized for the various myriad of service providers and cooperative agencies is to be considered. This means that the size of the facility will grow and that specialized spaces must be planned.

4-4-17 No response.

4-5-17 The urban elementary school must be reconceptualized to be a special service delivery agency to the neighborhood.

4-6-17 See statement for forecast #16.

4-8-17 I have nothing to add to this projection which has not been covered elsewhere.

4-9-17 Add 11-7 and 15-17 to my 9-17 remarks and you have my view.

4-10-17 No change.

4-11-17 I say again - new forms of "cultural - educational - recreational - social complexes are not working - because of the unwillingness and resistance of the different school - social agencies to share and work as a team. "Turf" problems must be resolved prior to facility design.

4-12-17 Same as forecast #2.

4-13-17 I agree with 3, 8, 11 and 15 not with #14.

4-14-17 No! See #4.

4-15-17 The need is for "learning communities" with a variety of educational, health and social services. Community schools are prevalent in many states, i.e. Michigan. Part of the impetus for this concept was stimulated by the Charles Stewart Mott Foundation located in Flint, Michigan.

Scenario #18: Social demand for education will increase while public expenditure for education will continue to be restricted. Government role will remain limited, but more federal funds may be spent in "matching" local efforts to finance educational innovations and research. Programs that enhance the basic curriculum may be financed through alternative means such as foundations.

Forecast #18: School districts will turn to private donations and foundations to supplement appropriations from local, state and federal governments. These funds will not be meant to replace government funds, but to enhance them.

4-2-18 As I reflect on this point again I believe rooms for "entertaining" potential donors may, unfortunately become a reality much as they have on most university campuses.

4-3-18 Inconsequential. This forecast will have no effect on the design of school facilities.

4-4-18 No response.

4-5-18 NOT to any significant extent.

4-6-18 Maybe public-private partnerships are possible. Get local business involved.

4-8-18 I can see funds from outside agencies being available only for limited projects. Does the fact that President Bush did not get the funds from private sources that he had hoped for give an indication that the sources of funds are not very extensive in the private sector. Also, I understand that Mr. Whittle has not found a ready source of funds for the schools he has proposed, even with the opportunity to operate schools and make money for the investors. For most school units in the K-12 sectors, this proposal is not very likely to have any implications for facilities.

4-9-18 May be true, but what impact on facilities? Does this suggest the school with the best grant writer will be the most successful?

4-10-18 No change.

4-11-18 No change from previous statement.

4-12-18 Inconsequential. This forecast will have no effect on the design of school facilities.

4-13-18 Inconsequential. This forecast will have no effect on the design of school facilities.

4-14-18 No! See #2.

4-15-18 No response.

Scenario #19: The U.S. population will continue to grow older as the median age of the population continues to rise. The aging of the "baby boomers", and advances in health care, nutrition and life-style will result in an increase of the proportion of middle aged and older adults in the U.S. population (age 35 and older). These older, mature adults will look to their local schools for continued, personal education and as classroom volunteers.

Forecast #19: Public Schools of the future will be called upon to educate not only students from the traditional ages of 5-17, but also older, even retired, adults. This expanded "adult education" role may include weekend or evening programs.

4-2-19 I agree with 9 that school are likely to become day care centers and with 13 that schools will be open many more hours a day and provide many, non instructional services.

4-3-19 The school must be viewed as the "total" educational unit serving those from age two through the entire life span. Not only must the school be used around the clock, but also the facilities must serve pre-school to geriatric needs. This requires a delicate balancing of needs when developing ed. spec.

4-4-19 "Public schools" will disappear but learning environments will be found everywhere for everyone.

4-5-19 Again, design, flexibility and space.

4-6-19 It can be a "two-way street". Older adults can teach and learn from younger adults and students — making all participants better learners.

4-8-19 The impact for facilities for the projected weekend and evening programs will not likely have much of an impact since they are likely to "make due" with what is available within the existing structures. One could hypothesize that they would want spaces where the instructors could store some of their supplies and equipment and non-traditional students may want to have spaces where they could store projects in process. This would be especially true in any of the programs where work on projects would extend over two or more class sessions.

4-9-19 This is happening. But beware! Does the school need to accept the responsibility for all social problems?

4-10-19 No change.

4-11-19 No change from previous statement.

4-12-19 See forecast #8.

4-13-19 I agree with #3, 6,8 and disagree with #14.

4-14-19 How about 24 hours-a-day from everywhere.

4-15-19 Schools will be for "education", not just "schooling" of a limited group of young people. Also, schools will serve all populations on an extended day, week or year schedule. This will impact the needed program capacity of facilities. This does have significance for "ed specs".

Scenario #20: Information technology will allow people to have virtual experiences in which they can "go" somewhere and touch, see, hear and possibly smell things as though they were there. They will do this without going anywhere. Virtual reality will inspire students and improve learning.

Forecast #20: "Virtual reality" will become a tool for teaching, particularly geography, history, science and someday math.

4-2-20 I see a place for 14's self-contained TeleModular Unit but I think it's a single aspect of a complex architectural development. I believe the drive to interact with other humans on a factual, "real" basis is so great that such components will have limited use.

4-3-20 Capacity to handle such "virtual reality" is important. Because it has not yet been defined - providing for such development is at best risky. Providing conduit to permit addition of specialized wiring is probably the best hedge against such development.

4-4-20 It won't become a tool for "teaching". It will become a tool for "learning".

4-5-20 Previous. No Response.

4-6-20 No response.

4-8-20 I have nothing to add that has not been suggested previously and in other areas.

4-9-20 Caution: "Prefer solid sense to wit; never study to be diverting, without being useful." - George Shelly

4-10-20 Please Proofread! Otherwise, no change.

4-11-20 The educational design issue becomes: do we design our future educational facilities for what we currently do; or do we design for the "known" future and have a totally different educational facility - that doesn't work. A review of current and planned schools shows we are still designing rows of traditional "cell blocks" with a media center.

4-12-20 No additional comments.

4-13-20 I agree with 3, 6 and most of #14 (except 10 x 10).

4-14-20 Yes! Virtual reality - using all senses, all modalities is the way of the future.

4-15-20 The usual characteristics are needed: adaptability, flexibility, suitability, adequacy, efficiency.

Scenario #21: Increasing numbers of states are facing crises with respect to funding public education. Several states' funding formulas have been determined unconstitutional or are under pressure due to tax caps and or concerns about inequality. Continually increasing costs of education combined with a shift in population demographics (aging, increased percentage of minorities, etc.) will force changes in how public education is funded.

Forecast #21: Inequities in funding of public schools will receive increasing levels of public attention resulting in court ordered restructuring of educational finances. This may include a shift from local to state (from private property tax formulas to sales or income tax formulas).

4-2-21 I believe that over time, IF facilities are made available to all, technology will contribute to the "equalization" of opportunity.

4-3-21 Important but facilities will still be needed. Could cause state-wide standardization of facilities!

4-4-21 The phony "goodness" of non-profit as somehow "cleaner" than profit-making is similar to "public" school as being "fairer" than non-public schools. The whole economic system will have to respond to the changed world. So will the political system of counties, states, and nations. Learning will no longer be a commodity controlled by a professional class.

4-5-21 This is evident in many states.

4-6-21 No response.

4-8-21 Potential changing to other sources of funding education is not likely to influence facilities as an educational factor. However, the use of other sources of funding could result in there being fewer funds available for education and a resulting reduction on the funds for new construction and renovation. Equity is an important issue. If the available dollars are going to be given in larger amounts to those currently at the lower end of the scale, facilities are likely to have be at a minimum. This could suggest that facilities will have to be used at a maximum or more will have to be of bare bones type. They are likely to have to be flexible, multiple use units.

4-9-21 Problem: more governmental funding could result in less diversity in both curriculum and facilities. That would be a shame.

4-10-21 No change.

4-11-21 Adding to the existing inequities is that the cost of educating low income and second language children is much more expensive than middle-high income suburban - rural children. They also require more "space and spaces"

4-12-21 Same forecast.

4-13-21 I agree with #3, 5, and 15 - and #14 is an interesting concept.

4-14-21 Answer #2.

4-15-21 This does not impact "ed specs", but does impact design and funding. Funding needs are the result of the programmed amount of space and the quality of the materials furnishings and systems. "Ed specs" should influence the amount of needed space. Architecture influences the quality.

Scenario #22: Within the next twenty years, many corporations are expected to trim their management hierarchies to half of their current levels. These corporations will be moving towards a more efficient management style of "networking", where lower level employees will operate more independently with increased decision-making responsibilities. Some operations previously handled "in- house" will be networked via technology to specialists outside or across the corporation. Small firms providing highly specialized services will fill in the gaps left by these restructured large firms.

Forecast #22: Through computer technology and networking, small companies will be able to compete successfully with large firms. Networks or management teams will replace management hierarchies in most corporations.

4-2-22 Nothing to add.

4-3-22 Suggest greater emphasis on cooperative learning. Schools to become centers for networking and retraining.

4-4-22 No response.

4-5-22 Inconsequential. This forecast will have no effect on the design of school facilities.

4-6-22 No response.

4-8-22 I do not envision that educational specifications will be impacted by the outcomes from this projection.

4-9-22 Inconsequential. This forecast will have no effect on the design of school facilities.

4-10-22 No change.

4-11-22 "Restructuring" of public education to include: site based leadership teams; changing "design teams", central "support staff", and new information systems should make major changes in places and spaces i.e. "centers for Educational Renewal".

4-12-22 Inconsequential. This forecast will have no effect on the design of school facilities.

4-13-22 I agree with #3 and 6.

4-14-22 14-22 stands as written.

4-15-22 Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #23: Recognition that environment (school buildings) affects learning is growing rapidly. New advances in technology/information retrieval is changing the design of learning spaces. Teaching methodology in all curriculum areas is being dramatically changed through the use of new technology.

Forecast #23: The relationship between learning, technology and physical facilities will play a major role in restructuring education and the planning of new schools.

4-2-23 Nothing to add.

4-3-23 This has been my theme throughout the survey. Buildings will have to be designed to be able to easily update the electrical/computer/multimedia changes. Schools will need to be flexibly designed to function year round. Adequate space to meet the many diverse learning needs of students.

4-4-23 No response.

4-5-23 See previous response calling for more space! Much research needs to be done on reaction of students to design elements, heat, cooling, light, etc.

4-6-23 Architecture for education = space for learning, including 1) individual study space, 2) small group places, and 3) facilities for large groups .... all supported and served by information systems (both electronic and print media) and by the resources of the community (libraries, museums, concert halls, colleges, government center, retail establishments, health center, research and production facilities.) That broader context is the more promising environment for learning.

4-8-23 I am sorry, but I can not respond very well to this forecast - the "relationship between learning, technology, and physical facilities will play a major role in restructuring education and the planning of new facilities." I do not see that technology and physical facilities will restructure education. I think that technology and physical facilities could or are very likely to change how education may be delivered: they could have positive and negative impacts upon how it is delivered. And, could have positive or negative impacts upon the learning that takes place. Let's hope that restructuring education has student learning as the prime focus and everything is done with that goal in sight. If learning isn't the focus, why restructure.

4-9-23 Larger school units will be organized into smaller administrative units. A school of 1800, for instance, would be organized as three 600 student schools within a school.

4-10-23 Yes. No change.

4-11-23 Technology and telecommunication could be the major catalyst for curriculum and instructional change. Thereby forcing new and different "educational specifications" and design of future schools.

4-12-23 Same forecast.

4-13-23 I agree with 1, 3, 6, 7, 9 but not with #14 except for last 4 sentences.

4-14-23 No new schools - see #4.

4-15-23 My previous statement reflects my reaction to your forecast. This could have a major influence on the "ed specs."

Scenario #24: In the future the organizational structure of schools will be called into question. Time-based promotion, age-graded classrooms and Carnegie units will be considered a less efficient educational structure. The needs of individual students will be seen as more important than traditional grouping practices.

Forecast #24: In the future, promotion between grade levels and graduation will be based upon the individual mastery of educational concepts and not by age. Students will be expected to exhibit mastery of pre-specified outcomes prior to promotion or graduation.

4-2-24 The impact on facilities will depend largely on the nature of the studies included. Where possible, "real world" sites would be used negating the need to build additional facilities.

4-3-24 Suggests spaces that are modifiable are important, work spaces that can be reconfigured as needs change are called for. Individual carrels, seminar spaces and large group spaces might be needed.

4-4-24 This scenario implies that credentials will still be important and that schools will continue to serve as a filtering, sorting mechanism. All of my responses suggest a "more natural learning environment with living, working, and learning being integrated and without age segregation. "Students" will, therefore, be known to the community in a holistic sense and the artifice of grade levels, graduation and diplomas will be empty by comparison and will wither away.

4-5-24 Inconsequential. This forecast will have no effect on the design of school facilities.

4-6-24 Space for individualized instruction is the prime need. Each student, having an individualized program, progresses at his or her own pace, interacting with other individuals, small groups, and large groups. The module for planning the curriculum and for planning the facilities, will be one person, not one classroom.

4-8-24 I expect this scenario to develop as the result of research in regard to learning and the applications of that information becomes more widely known by parents and teachers. Then school programs could be developed around those understanding. I believe it would be a serious error to project what the facilities would be like before knowing how the programs will be defined. When that definition is made then ed specs may be developed which could result in facilities to house the projected programs effectively. Are the projected programs going to be similar to correspondence courses so children can work through the prescribed courses at their own rates of speed and be in school only for as long as it takes to run through the prescribed course? Are projected programs likely to be communities of learners of many ages working cooperatively in exploring societies problems with learning being a significant consequence. The more able helping the younger or helping the less advanced make progress and those in both groups learning while they are living. When such questions are answered, the ed specs can be developed. Conjecturing about the future would be fun but I sense you are looking for specifics.

4-9-24 This will require more cooperation between and among all educational levels from elementary through higher education.

4-10-24 No change.

4-11-24 Let's not forget that the environment for learning (the place and space) needs to be artistic, stimulating, changeable, warm and exciting. Freeing ourselves from the Carnegie Unit could be another exciting force for change.

4-12-24 No additional changes.

4-13-24 I agree with 3, 5, 6 and 10.

4-14-24 14-24 stands.

4-15-24 A vast majority of future jobs will be related to the service sector. Even so, employees need to be cooperative, dependable, and enthusiastic employees. Currently our largest employers are McDonald's, Burger King, Government, and ? What skills do employees need? Certainly, basic academic skills, this forecast is more related to methodology than structures.

Scenario #25: Volunteering will become increasingly important in society as the population grows, money shrinks and the need for support of social service agencies increases.

Forecast #25: Volunteering, off-campus programs, learning in the community, helping others, tutoring, working/studying in social agencies and hospitals, et. al. will dramatically increase in the coming years.

4-2-25 The responses to #25 are missing.

4-3-25 Will still need spaces to accommodate programs, children, and staff. Flexibility will be important as well as multi-use spaces.

4-4-25 Everyone will be a teacher, everyone will be a learner, and learning environments will exist everywhere. So professional teaching will disappear. This is not exactly what we currently mean by volunteering, but the results will be the same even if the reasons are different.

4-5-25 No response.

4-6-25 Education will be the primary concern of the community. Seeking to provide maximum opportunities for learning, the community will be the place for education. The school will be the focal point, but learning will not be confined to that location; students will become acquainted with the wide resources of the community.

4-8-25 One can envision programs of the nature suggested in the forecast being related to a host of school programs: social studies, science, home economics or human ecology, technology, in fact all or nearly all the school's programs could relate to such programs at levels increasing in amount with the age of the students. The impact on educational facilities could suggest that space would be required for those who are scheduling the activities. These would vary depending upon centralized scheduling or scheduling by individual coordinators in the various school programs. They could involve cooperative efforts between the school's programs and various community agencies and business and industry. Some might envision that space could be saved in the school centers since the students would be in the community. I know one district that attempted to have all the children in a high school grade in the community so they did not need room in the school for that one class. For many reasons, it did not work and had to be abandoned. One would assume that such a bold venture would require much, much planning. I am not sure that businesses and industry are sufficiently stable to guarantee that degree of involvement being reality. How much classroom space could be avoided would be difficult to project as a forecast scenario.

4-9-25 Volunteers will need a place to "office" and a place to plan. If volunteer programs are part of the curriculum, the ed specs will need to recognize input from both the sending and receiving institutions.

4-10-25 Inconsequential. This forecast will have no effect on the design of school facilities.

4-11-25 Let's not forget that the environment for learning (the place and space) needs to be artistic, stimulating, changeable, warm and exciting. Freeing ourselves from the Carnegie Unit could be another exciting force for change.

4-12-25 No change in the facility is needed. Access to the facility must be addressed to enable people to feel welcome. The facility does not have to change; only our attitudes need to change.

4-13-25 Future schools will need to accommodate and address all age levels from preschool to old age. Schools will be open early in mornings to late at night and on weekends and will truly become community centers. Teachers will become facilitators with assistance from ages and backgrounds to assist in tutoring and assisting poorer students. Brighter students will help poorer students of all age groups. Learning will become more of a team process where all in the team grow and learn together.

4-14-25 See #4.

4-15-25 We have moved in society and educational circles from 1) agriculture, to 2) industrial to 3) information, to 4) learning community styles and activities. Learning community society is where many community services cooperate among themselves and with schools to provide for a better educated citizen. The school may become the "hub" for all activity, even though much of activity or learning may take place in multiple locations. I am aware of one new community which is in the beginning phase of planning and designing for a learning community. The components are the schools, a public library, a parks and recreation center, a hospital health center, a senior citizen center, government service center, a higher education training and re-training center, and community arts center. This concept has implications for "ed specs" and the resulting architectural design.

Scenario #26: In a recent Roper Organization poll, AIDS, crime and drug abuse were the issues listed about which Americans were the most concerned. One of these, drug abuse, has many educators worried. Children born to mothers who are drug users, particularly the drug "crack", are more likely to be born with physical impairments than are children of non-drug using mothers, and are several times more likely to be socially, emotionally or intellectually delayed. These children, who will often exhibit multiple disorders, will have special educational needs.

Forecast #26: The problems exhibited by children born to drug addicted mothers will cause educators to alter the approaches they utilize in educating children. New definitions for achievement may result and categories of special education may be expanded.

4-2-26 Nothing to add.

4-3-26 Spaces designed to accommodate these special children.

4-4-26 No response.

4-5-26 Special ed programs will continue to grow in terms of self-contained kids as well as those participating in full inclusion.

4-6-26 No response.

4-8-26 The impact could well be severe, especially in some communities. While these special needs children will need care, I am assuming that inclusion will be the mode of the future rather than segregation in special education classes. I envision students being identified and individual educational programs being prescribed for them which hopefully could be done in cooperation with the parent(s). How many drug addicted parents would be available for such planning sessions? Inclusion suggests that the students will have their educational experiences provided in regular classes. However, every class in which there is a special education student would have to have another person in addition to the regular teacher in the room helping the teacher provide instruction for all the children in the class, including the handicapped child. The regular teacher in cooperation with the second person in the room would determine the types of experiences which would be all inclusive or would be provided for portions of the class which learn under similar circumstances. That being the case, I would envision more staff to be certain there would be enough teachers to assist with the learning for the special students in appropriate settings as a part of the regular class. Three or four special education students would not be grouped in the same class because of the cost for the helping persons. Doing that would not be inclusion. Ed specs would not include special rooms for the mentally handicapped, for example, as are now provided. The students would be in the regular classrooms. The point being that they would not be in special rooms as adults; they would be involved with random segments of the general population of people. There would be office spaces and conference rooms where the IEPs would be developed.

4-9-26 See 9-26 — and this additional space will require additional staffing — about a 1-3 ratio.

4-10-26 No change.

4-11-26 We must recognize the need for widely differing "learning styles".

4-12-26 Inconsequential. This forecast will have no effect on the design of school facilities.

4-13-26 I agree with #6.

4-14-26 #14-26 stands.

4-15-26 No need to change my previous response to this forecast. Most of the spaces and equipment needed to educate exceptional children are the same as those needed by the "so-called "normal".

Scenario #27: Information and communication technology at the global scale and differences in time zones will make global communication an around the clock around the globe affair. We will be able to, and need to, reach-out from our homes to the world.

Forecast #27: Just as the office at home is already a reality, the classroom at home will be a supplement to formal school classrooms. The media room at home will be the growth center for adults and children alike.

4-2-27 I agree completely with 10. I don't believe 11's vision will come pass and I know 14 has exaggerated what will come to pass.

4-3-27 Inconsequential. This forecast will have no effect on the design of school facilities.

4-4-27 No response.

4-5-27 Inconsequential. This forecast will have no effect on the design of school facilities.

4-6-27 "Classroom at home" is misleading; it's not a classroom; it's a different kind of learning, highly individualized, influenced by parent, brothers and sisters.

4-8-27 This forecast does not suggest whether the classroom-at-home will be for in home instruction in lieu of classrooms in the schools or supplements to the school setting for home work or other experiences related to the child's school program. If the latter, there would not be any implications for the ed specs.

4-9-27 How can the home take this on when the traditional family does not exist. This underscores answer 9-27.

4-10-27 6 is on target, 9 may be (and 11), 14 will have his Camelot where machines will be programmed and children with them. And since 14 leaves out apostrophe's - the possessive will disappear. No change.

4-11-27 The new "school library" will need to include check out software, portable computers, and other learning tools.

4-12-27 No additional comments. Inconsequential. This forecast will have no effect on the design of school facilities.

4-13-27 I agree with #6, 9, [illegible] and 12 and whole heartedly support social aspects of #6 and 10.

4-14-27 #14-27 stands.

4-15-27 We continue to try to solve a need without understanding the situation or need. I see many places including homes as a resource to learning. Yes, other places should supplement, not supplant, the formal classroom. This is a part of global communication which is happening. Now in many "lighthouse" locations. Inconsequential. This forecast will have no effect on the design of school facilities.

Scenario #28: Consortium of computer companies decides to put PCs in front of every school child. This initiates a greatly increased use of computers in school. New discoveries about learning result and networks expand.

Forecast #28: Learning (computer based) becomes a national (and global) network-based process. Cross boundary fertilization of education and educational ideas, i.e. U.S.-Japan interchange.

4-2-28 Nothing to add.

4-3-28 Capacity to handle them.

4-4-28 14 hits the Jackpot!!

4-5-28 Yes.

4-6-28 No response.

4-8-28 This forecast suggests that computers will be required. It makes no mention of what strategies are envision on how the programs will be made operational. One would need to know what capabilities computers which are mentioned would have or could produce. Will they provide visual and oral communication? Unless those are defined, ed specs can not be projected. Oh, one could project them for exercise, but one needs to know the programming potentials first for any things of essence which can come from the exercise.

4-9-28 Inconsequential. This forecast will have no effect on the design of school facilities.

4-10-28 No change.

4-11-28 No change.

4-12-28 Same forecast.

4-13-28 I agree with #6 and 8.

4-14-28 Same #14-28.

4-15-28 Historically computers have been stand alone systems. The current generation is one of networking. Networking must be global in concept. In terms of "ed specs". This suggests more "hands on" type of space at all user locations. Inconsequential. This forecast will have no effect on the design of school facilities.

Additional comments from round one participants:

9-29 In my work, clients are beginning to question the design of classrooms and the library. We are in an era of change, technology is moving faster than those of us not directly involved can comprehend. The challenge is to realize we must design for technology, but not at the expense of the arts. There is more to learn from reading Les Miserables than there is from watching the movie.

12-29 The forecast are fine but one must still be aware of the reluctance of governing agencies and parents to allow facility innovation as projected through the forecasts. Unfortunately, that obstacle is not addressed specifically in the forecasts. Ideally, schools as we now know them will not exist in the future. Realistically, society may keep schools from changing.

Additional comments from round two participants:

4-2-29 We often speak as though the future were inevitable and we could have no impact on its direction. We need to talk about our values first, then our current realities and then the directions we hope to take. We might also deal with the current trends and discuss how to redirect.

4-3-29 Remember - we are developing ed. specs for a school, not a strategic plan for restructuring education.

4-8-29 The last two sentences forecast a dead lock. Now we are back to the book published in the latter part of the first half of the 20th century entitled Dare the Schools Change the Social Order? Possibly it should have addressed the topic: Can the Schools Change the Social Order? And now: Can education change the ed specs or will they be predetermined? And educational programs forced into the mold.

4-9-29 We could well heed the words of them A. S. Commissioner of Education Harold Howe: "Like the drug for which there is as yet no disease, we now have some machines that can talk but have nothing to say. I would caution the businessman not to venture into hardware unless he is prepared to go all the way into printed materials and programming. Otherwise, he will have created an empty vessel or simply a glorified page turner." -Speech 1966

4-10-29 You would get a better response if you limited the number of scenarios and eliminated what most of us saw as duplication. You would appear to be more serious and interested if you took the time to insure proper spelling, grammar, punctuation.

4-11-29 What exciting years ahead for planners, change agents, and "kids". What trauma for those locked into the past.

4-12-29 Where is the rest of this?

4-13-29 I agree whole heartedly. 12-29 I disagree, for who is society but us. We can make the changes as necessary if we have the will and determination.

4-14-29 I made up a scenario that picked-up things you left out. I did not see it. It talked about the socialization of students under my scenario. Important, if you want to understand my point of view.

4-15-29 The challenge is to design facilities for the delivery (methodology) of the educational program, not for technology. Technology is one of the communication systems available to enhance learning. If we desire the maximum use of technology, the users must understand its capability and know how to use it. There is a great need to restructure our public school system. This may mean a different way of doing things. I find that society is begging for change. Obviously, there are individuals and groups who have determined the solution to change, but may in reality become impediments to change. This forecast had considerable implication for educational specifications. We need to remember that "ed specs" are a means of communication between users and designers. It should state how education will happen, not how to soive the A/E problems. I feel there is a lack of understanding about "ed specs" are, their purpose, and their content.

Appendix J

Survey Instrument Round Five

Architectural Programming
For
Educational Futures

Final Round

New Franklin R-1 School District

"A Recognized School of Excellence"
United States Department of Education

November 1993

November 7, 1993

Dear Colleague:

Thank you for completing round two of the survey on architectural programming for educational futures. The responses to the various forecasts were both insightful and comprehensive. I hope you found the other participant's responses as enjoyable and informative as I did.

This third (and final) survey instrument represents the qualitative analysis of the round one and two survey responses. In this survey you will receive twelve short themes, along with a series of programming considerations correlated to each of these themes. You are asked to rate these series of programming considerations on a six point Likert scale as to probability of occurrence and years to widespread acceptance. A sample from twenty years ago has been included on the following page.

If you should wish to add comments to your responses, a section has been added at the end of the survey. You are not obligated to write additional comments to your responses.

I hope you find this survey short, enjoyable and indicative of the group's responses. Your participation, expertise and vision has greatly enhanced its success. Again, my sincere thanks for your assistance.

Please return this survey in the enclosed envelope by November 30, 1993.

Sincerely,

Kelvin L. McMillin

SAMPLE ROUND THREE

Sample Theme : The effect of federal legislation on the school.

Section 504 of the Rehabilitation Act of 1973 and the Education for All Handicapped Children Act of 1975 will expand the program offerings of local school districts to include handicapped children with particular emphasis on special education and related services designed to meet their unique needs.

Programming Considerations:

*K-12 school facilities will be "retrofitted" with ramps or elevators instead of stairs. New facilities should include these adaptations in their design.

*Additional classroom space will be required to house "special education" programs . This space will be smaller than a traditional classroom due to the small number of students involved.

*Adaptations may be necessary for the orthopedically handicapped. These adaptations may include restroom facilities, water fountains, and doorways.

*Adaptations for the handicapped must include the school site as well as the school building. This has implications for parking, recreational facilities and landscaping.

Probability of the above considerations being widely accepted:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above considerations will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Theme #1: The Community Use of Facilities.

The mission of the school will expand from educating the traditional bracket age group (5-18) to educating a community of life-long learners. The local school will offer educational, cultural and recreational programs to meet the needs of pre-school through geriatric age students.

Programming Considerations:

*School facilities may be open for an extended length of time, which may include around-the-clock or year-round use. The internal and external facility may be designed to be "zoned", thereby restricting access to certain areas at certain times of the day.

*The school plays an important function in meeting the socialization needs of the community. As such, access to meeting rooms, recreational facilities, libraries, food service facilities and specialized labs is important.

*As a community center the school site should have pedestrian access and links to parks, good auto access and parking, and sufficient night lighting.

*As a community center, the school may cooperate with outside agencies and centers to cooperatively house their programs under one roof. The implications are larger facility size, specialized spaces in addition to classrooms and broadened financial capability.

*Areas of the facility with multiple uses (particularly those used by outside groups) will require increased and possibly specialized storage areas.

*The facilities should be designed with materials that are durable and easily maintained. Constant use requires constant cleaning.

Probability of the above considerations being widely accepted:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above considerations will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Theme #2: Extended Hours/Year Round Access.

The traditional school day and year is being challenged in many communities. In addition, some schools have chosen a year-round rotating schedule for students, thereby increasing building capacity by as much as 20 to 25 percent. An extended day or year round facility has several unique programming characteristics.

Programming Considerations:

*The facilities should be designed with materials that are durable and easily maintained. Constant use requires constant cleaning.

*The facility should be climate controlled and make take advantage of advancements in window design, insulation and solar energy technology.

*Increased daily hours and concerns about building security should be reflected in the design of the facility. Security "zoning" may restrict access to certain areas at certain times of the day. Schools in high crime areas may consider metal detectors in entrance and classroom doorways.

*Increased use of facilities by community groups or year-round programs may require additional specialized storage areas.

*Electronic access to school library/media/research resources may be made available to community or after-hours users through computer networks or interactive television . This 24 hour access requires specialized electrical and communications wiring.

Probability of the above considerations being widely accepted:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above considerations will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Theme #3: The school as a pre-school and before- and after school care center.

The number of single parent households and households in which both parents work are increasing dramatically. Teenage pregnancy is on the rise. The need for affordable, developmentally appropriate pre-school or child care programs is evident. Unfortunately, child care programs that are of high quality are also expensive or limited. Research has shown that developmentally appropriate pre-school educational programs are cost effective because they reduce grade failure and dropout rates. Future school offerings will include pre-school programs and before-and-after school care.

Programming Considerations:

*Educational, play and classroom toilet areas, along with classroom furniture should be scaled to the physical size of the students.

*Pre-school facilities should be located in proximity to primary school classrooms and out of the traffic pattern of upper grade students.

*Classroom furnishings should encourage small group activities and exploration of materials and ideas.

*Facilities for pre-school and extended day programs should incorporate or provide access to food service areas that are safe for child and adult use.

*Personal storage areas (cubbies or mini-lockers) should be made available to all pre-school or extended day students. Additional storage for extended day classroom resources is desirable.

*For safety, pre-school and extended day programs should be located in controlled areas that are restricted access.

Probability of the above considerations being widely accepted:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above considerations will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Theme #4: Service Agencies/Prevention Services for At-Risk Children.

Schools and service agencies have begun to recognize the importance of coordinating their efforts to assist at-risk children. Early intervention and prevention programs representing a variety of agencies will be housed at the local school, thereby providing a comprehensive and concerted effort to meet the physical, intellectual, emotional and social needs of all students.

Programming Considerations:

*As a community center, the school may cooperate with outside agencies and centers to cooperatively house their programs under one roof. Service spaces could include such options as a psychologist, social welfare worker, food service or even minor health/medical (including prenatal) and dental.

*A variety of spaces may be needed, ranging from specialized rooms pertinent to the services offered, separate or common office spaces and conference/meeting rooms.

*Decisions related to separate or centralized record keeping and access to those records should be addressed. Electronic record keeping may facilitate the interaction between service agencies and the school.

*The broadened nature of offered services should result in equally broadened financial capability to provide such a facility.

*Student security may be addressed through scheduling of services, duplication of entrances (community/outside and school/inside) or the zoning of service agency areas.

*Community volunteers will provide nurturing experiences (reading, teaching) to at risk students. A variety of comfortable, small group areas will be used for this contact.

Probability of the above considerations being widely accepted:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above considerations will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Theme #5: Cultural Diversity and School Facilities.

The U.S. population increasingly reflects minority groups. Within a decade, one in every three students will come from a minority background. At some point in the future, the "majority" population will consist of groups of "minorities."

Future curriculum content will address the issue of diverse cultural values and languages. Multidisciplinary teams will facilitate study of ethnic art, architecture, food, history, government and literature as well as language.

Programming Considerations:

*Increased flexibility in school architecture, room decor and display centers may serve as a medium to reflect a variety of ethnic cultures.

*Interactive television classroom facilities will permit foreign language students the opportunity to talk face-to-face with students of other cities, states or nations.

Probability of the above considerations being widely accepted:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above considerations will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Theme #6: Flexibility in School Facilities.

The schoolhouse can no longer be thought of as a group of rigid spaces that do not change. Instead schools are places where activities change daily and therefore space and equipment must change also. In addition, most school structures are built for a lengthy lifespan whereas technology and society are changing at a rapid rate. Future facilities must be capable of adapting to these changes.

Programming Considerations:

- An increasingly changing society makes it difficult to forecast future needs, therefore facilities should be designed around the principles of flexibility and adaptability.

- Facilities should be planned for the maximum use of technologies not just one technology. Designers must plan for ever changing (and yet unforeseen) technologies.

- Areas with radical fluctuations in enrollment may consider the use of modular classroom facilities which can be added or removed based upon need (these should not be confused with converted mobile homes).

- A need may exist for office space for scheduling and organizing relevant educational experiences correlated with the resources of the community (libraries, museums, concert halls, research facilities, health centers, research and production facilities.

- The notion of "standard" sized classrooms placed on both sides of a long hallway in the traditional "egg carton" fashion will give way to a variety of classroom shapes, sizes and furnishings. This variety will be enhanced by movable walls and utilities to facilitate changing group structures for learning.

Probability of the above considerations being widely accepted:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above considerations will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Theme #7: Electronic Media in Curriculum, Instruction and Assessment.

Classrooms of the future will be equipped with a variety of technological equipment in very flexible classroom arrangements so that learning groups can be involved as individuals or pairs at times, can move into small group activities of many types, can communicate with a resource center in the school or to anyplace in the world. The emphasis will be on using technology as a learning tool, rather than technology as a subject matter.

Programming Considerations:

*Schools should incorporate a variety of technologies, not just one specific technology as in "fiber optics." The challenge will be will be to design facilities for the delivery of the educational program, of which technology may be one of the mediums to enhance the process.

*For the near future schools should be planned with an interactive television "distance learning" room. All classrooms should be "wired" for this technology (electricity and fiber optics or cellular), thereby providing capability of moving equipment to various areas or someday expanding distance learning use to several classroom areas. Movable, large and thin, liquid crystal display (LCD) panels may one day replace televisions as the medium for viewing video transmissions.

*At present, interactive television requires specially designed lighting and acoustics unique to the technology. This includes sound absorbing walls, controlled artificial lighting, specialized equipment for audio and video transmission/reception.

*Interactive television may have implications for community use. Future society will require that community members be "life-long learners." Community members may desire continued education to keep abreast of changes in society, businesses may expect new knowledge or skills of their workers, and retired community members may desire further education just for fun. In each of these scenarios, interactive television can link businesses and communities to neighboring communities, business professional development programs or even local and national institutions of higher education. The result would be a live, interactive network for adult and continuing community education. Implications for facilities are interactive "distance learning" classroom with community access.

*Virtual reality is quickly becoming more defined as a technology. Since its capability has not been fully defined, the best hedge for its school use is to provide conduits and connections to permit the addition of specialized wiring in the future.

*Computers may play a minor role in the diagnosis and prescription of student learning, however they will play a major role in the access to information. This access may be stationary as in a fixed media lab, it may be portable as in network connections for portable computers at all student workstations, or the access may be off site where students or community members can access the school's network or any other network via their home or work computer. The available information is at present predominantly non-interactive audio, video and data, but may soon include full interactive capability.

*The traditional stand-alone computer lab will be replaced by networked computers which will be integrated throughout the building. The implication is increased network cabling and electrical capacity. At present the increased electrical capacity may be in amperage and outlets, but increased efficiency of computer design may reduce the requirements for amperage in the circuits. Classroom sizes may be larger or smaller based upon advancements in computer hardware design.

*Advancements in lap-top, notebook and notepad computers may make it possible in the future to issue portable computers to students on a loan and use basis to be taken from class to class. This suggests electrical and networking connections and more hands on space at all locations.

*Electronic media has the potential to link classrooms across the state, nation or even the world. However, the geometric advancements in technology make it imperative for schools to consider adaptability, flexibility, suitability, adequacy and efficiency when discussing the use of technology in the classroom.

Probability of the above considerations being widely accepted:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above considerations will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Theme #8: A Variety of Instructional Methods and Strategies.

We would expect our medical doctors to treat their patients with the latest techniques and prescriptions known to modern medicine. In turn educators should be expected to use the most modern and research proven instructional strategies with their students. The lecture method of teaching, which has been a mainstay of education for centuries, is being supplemented by more recent knowledge in individualized and group instruction, learning styles of students, team teaching and cooperative learning.

Programming Considerations:

*The role of the teacher will be predominantly that of facilitator. As a facilitator, teachers must have ready access to planning or preparation areas, access to a variety of technology in their office and instructional areas, and access to support space for conferencing, volunteers and storage.

*Interdisciplinary team teaching would be facilitated by common support/ planning areas and common planning times during the day.

*A variety of instructional groupings must be facilitated including individualized, cooperative teams or groups, whole class and interactive distance learning. If instruction is truly individualized, multidisciplinary and multi-age grouping may occur. This implies individual study spaces, small group areas, seminar spaces and large open areas all of which may be reconfigured or modified as needed. In addition, individual and small group storage space will be required.

*As instructional environments and instructional methods vary with need, it is important that adequacy, access to and location of technology be considered. Regardless of the configuration, students and teachers must have access to technology (electrical access, interactive video, network data or some as yet undiscovered technology). In addition, the ability to upgrade or add new technology to the instructional environment should be considered.

*The flexibility of instructional grouping must be matched by equal flexibility and adequacy of electrical and computer/interactive television network connections. These connections must be numerous enough and well placed so as to permit walls and furniture to be moved as needed.

*Artificial lighting, climate control and sound absorbing wall, ceiling and floor materials will be desirable in all classrooms, particularly those involving computers and interactive television technology.

Probability of the above considerations being widely accepted:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above considerations will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Theme #9: Teacher Planning and Professional Development.

Schools are responding to a need to graduate students who have demonstrated through outcomes assessments that they can produce. To facilitate this teachers will have to become more knowledgeable about research in effective teaching strategies and then work with other teachers in defining appropriate instructional methods and outcome assessments. In essence the role of the teacher will become that of facilitator.

Programming Considerations:

*Teachers will need improved office areas with electronic media access where they will be able to personally review research, study and plan.

*Teachers will need areas where small groups of teachers and entire faculties can meet cooperatively to learn and plan programs. This cooperative planning may be interdisciplinary at times, other times departmentalized.

*Through interactive television links to colleges, universities and state agencies, continuing professional education for teachers (inservices and graduate school) will be as accessible as their own classroom.

Probability of the above considerations becoming widespread:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above considerations will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Theme #10: Financing Future Facilities.

The financing of future educational facilities may not have a large impact on the educational specifications. However, it may effect the size of the facility and the quality of construction.

Programming Considerations:

- Given the trend of diminished financial support for education and if the facility is designed to only house the educational program, then the facility will probably be of the "bare-bones" variety.

- If the facility is designed to be a community center which houses a variety of service agencies and the educational program, then the design of the facility and the quality of furnishings and systems will be more substantial based upon a larger, shared financial base.

Probability of the above considerations being widely accepted:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above considerations will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Theme #11: Special Education.

The movement in special education is towards the inclusion of special needs students in the regular classroom. These students may have larger space requirements than the regular student and could require the assistance of additional staff.

Programming Considerations:

- The movement in special education is towards the inclusion of special needs students in the regular classroom. The implications for facilities may be larger spaces for general instruction (approximately 10-15% larger).
- Conference and office areas will be necessary for meetings and IEP development (Individualized Education Program).
- Consistent with current requirements for special needs students, ramps and elevators will take the place of stairs in buildings with elevation changes.
- Support staff may need work and planning areas.

Probability of the above considerations being widely accepted:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above considerations will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Theme #12: The Multi-Location Multi-Media Educational Experience.

In the future it is likely that a stronger link will exist between the resources of the school, community and industry. Students may have physical or electronic access to community resources such as libraries, museums, concert halls, colleges, government centers, retail establishments, health centers, and research and production facilities. In turn, when industry needs people with new skills the school will respond with re-training programs or facility access.

Programming Considerations:

- Additional learning opportunities may be available through a home-school-industry-world technology connection. This connection is at present predominantly voice, video and data (predominately computer), but could include interactive video or more advanced technologies in the near future. This home learning environment will not supplant the school (socialization and culture is still an important function of the school) but will supplement the school's learning environment. The implications for schools (and homes) are multi-media or hyper-learning areas, decisions on types of technology (or even standardization of technology) and the appropriate access connections (fiber optic, cellular, electrical, etc).

- Industry re-training will be assisted at the local level by physical or electronic access to the school (conference or classrooms, interactive television rooms, computer access). Interactive, multimedia technology in the schools or even at the industry site may provide the networking capability for large scale, multi-site re-training.

- Students in the future are likely to gain additional education and experience off of school grounds by visiting community and industry resources. The implication for schools might be office space for coordination of activities.

Probability of the above considerations being widely accepted:

☐ Highly probable. Will unquestionably occur.
☐ Probable. A strong possibility that it will occur.
☐ Somewhat probable. A weak possibility that it will occur.
☐ Somewhat improbable. A weak possibility that it will not occur.
☐ Improbable. A strong possibility that it will not occur.
☐ Highly improbable. Will unquestionably not occur.

Time:

The above considerations will become widespread in how many years?

TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Comments:

Please return this survey by

November 30, 1993.

Your participation, vision and expertise has greatly enhanced its success.

Thank you.

Appendix K

Survey Instrument Round Five Results

Architectural Programming
For
Educational Futures

Final Round Results

New Franklin R-1 School District

"A Recognized School of Excellence"
United States Department of Education

November 1993

Theme #1: The Community Use of Facilities.

The mission of the school will expand from educating the traditional bracket age group (5-18) to educating a community of life-long learners. The local school will offer educational, cultural and recreational programs to meet the needs of pre-school through geriatric age students.

Programming Considerations:

- School facilities may be open for an extended length of time, which may include around-the-clock or year-round use. The internal and external facility may be designed to be "zoned", thereby restricting access to certain areas at certain times of the day.
- The school plays an important function in meeting the socialization needs of the community. As such, access to meeting rooms, recreational facilities, libraries, food service facilities and specialized labs is important.
- As a community center the school site should have pedestrian access and links to parks, good auto access and parking, and sufficient night lighting.
- As a community center, the school may cooperate with outside agencies and centers to cooperatively house their programs under one roof. The implications are larger facility size, specialized spaces in addition to classrooms and broadened financial capability.
- Areas of the facility with multiple uses (particularly those used by outside groups) will require increased and possibly specialized storage areas.
- The facilities should be designed with materials that are durable and easily maintained. Constant use requires constant cleaning.

Probability of the above considerations being widely accepted:

4 Highly probable. Will unquestionably occur.
7 Probable. A strong possibility that it will occur.
1 Somewhat probable. A weak possibility that it will occur.
____ Somewhat improbable. A weak possibility that it will not occur.
____ Improbable. A strong possibility that it will not occur.
____ Highly improbable. Will unquestionably not occur.

The above considerations will become widespread in how many years?
Time: Mean = 9.55 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	3	5	1	☐	1	☐	☐	☐	☐	☐	1

Theme #2: Extended Hours/Year Round Access.

The traditional school day and year is being challenged in many communities. In addition, some schools have chosen a year-round rotating schedule for students, thereby increasing building capacity by as much as 20 to 25 percent. An extended day or year round facility has several unique programming characteristics.

Programming Considerations:

- *The facilities should be designed with materials that are durable and easily maintained. Constant use requires constant cleaning.
- *The facility should be climate controlled and make take advantage of advancements in window design, insulation and solar energy technology.
- *Increased daily hours and concerns about building security should be reflected in the design of the facility. Security "zoning" may restrict access to certain areas at certain times of the day. Schools in high crime areas may consider metal detectors in entrance and classroom doorways.
- *Increased use of facilities by community groups or year-round programs may require additional specialized storage areas.
- *Electronic access to school library/media/research resources may be made available to community or after-hours users through computer networks or interactive television . This 24 hour access requires specialized electrical and communications wiring.

Probability of the above considerations being widely accepted:

4___Highly probable. Will unquestionably occur.
6___Probable. A strong possibility that it will occur.
2___Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
_____Highly improbable. Will unquestionably not occur.

The above considerations will become widespread in how many years?
Time: Mean = 13.18 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	4	1	2	3	1	☐	☐	☐	☐	☐	1

Theme #3: The school as a pre-school and before- and after school care center.

The number of single parent households and households in which both parents work are increasing dramatically. Teenage pregnancy is on the rise. The need for affordable, developmentally appropriate pre-school or child care programs is evident. Unfortunately, child care programs that are of high quality are also expensive or limited. Research has shown that developmentally appropriate pre-school educational programs are cost effective because they reduce grade failure and dropout rates. Future school offerings will include pre-school programs and before-and-after school care.

Programming Considerations:

*Educational, play and classroom toilet areas, along with classroom furniture should be scaled to the physical size of the students.

*Pre-school facilities should be located in proximity to primary school classrooms and out of the traffic pattern of upper grade students.

*Classroom furnishings should encourage small group activities and exploration of materials and ideas.

*Facilities for pre-school and extended day programs should incorporate or provide access to food service areas that are safe for child and adult use.

*Personal storage areas (cubbies or mini-lockers) should be made available to all pre-school or extended day students. Additional storage for extended day classroom resources is desirable.

*For safety, pre-school and extended day programs should be located in controlled areas that are restricted access.

Probability of the above considerations being widely accepted:

4___Highly probable. Will unquestionably occur.
3___Probable. A strong possibility that it will occur.
4___Somewhat probable. A weak possibility that it will occur.
_____Somewhat improbable. A weak possibility that it will not occur.
_____Improbable. A strong possibility that it will not occur.
1___ Highly improbable. Will unquestionably not occur.

The above considerations will become widespread in how many years?
Time: Mean = 10.00 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	2	3	1	3	2	☐	☐	☐	☐	☐	☐	1

Theme #4: Service Agencies/Prevention Services for At-Risk Children.

Schools and service agencies have begun to recognize the importance of coordinating their efforts to assist at-risk children. Early intervention and prevention programs representing a variety of agencies will be housed at the local school, thereby providing a comprehensive and concerted effort to meet the physical, intellectual, emotional and social needs of all students.

Programming Considerations:

- As a community center, the school may cooperate with outside agencies and centers to cooperatively house their programs under one roof. Service spaces could include such options as a psychologist, social welfare worker, food service or even minor health/medical (including prenatal) and dental.

- A variety of spaces may be needed, ranging from specialized rooms pertinent to the services offered, separate or common office spaces and conference/meeting rooms.

- Decisions related to separate or centralized record keeping and access to those records should be addressed. Electronic record keeping may facilitate the interaction between service agencies and the school.

- The broadened nature of offered services should result in equally broadened financial capability to provide such a facility.

- Student security may be addressed through scheduling of services, duplication of entrances (community/outside and school/inside) or the zoning of service agency areas.

- Community volunteers will provide nurturing experiences (reading, teaching) to at risk students. A variety of comfortable, small group areas will be used for this contact.

Probability of the above considerations being widely accepted:

3___Highly probable. Will unquestionably occur.
5___Probable. A strong possibility that it will occur.
2___Somewhat probable. A weak possibility that it will occur.
1___Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
1___ Highly improbable. Will unquestionably not occur.

The above considerations will become widespread in how many years?
Time: Mean = 16.82 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	**2**	**3**	**1**	**1**	**2**	☐	☐	☐	☐	**1**	**1**	**1**

Theme #5: Cultural Diversity and School Facilities.

The U.S. population increasingly reflects minority groups. Within a decade, one in every three students will come from a minority background. At some point in the future, the "majority" population will consist of groups of "minorities."

Future curriculum content will address the issue of diverse cultural values and languages. Multidisciplinary teams will facilitate study of ethnic art, architecture, food, history, government and literature as well as language.

Programming Considerations:

- *Increased flexibility in school architecture, room decor and display centers may serve as a medium to reflect a variety of ethnic cultures.
- *Interactive television classroom facilities will permit foreign language students the opportunity to talk face-to-face with students of other cities, states or nations.

Probability of the above considerations being widely accepted:

5___Highly probable. Will unquestionably occur.
4___Probable. A strong possibility that it will occur.
2___Somewhat probable. A weak possibility that it will occur.
1___Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
___ Highly improbable. Will unquestionably not occur.

The above considerations will become widespread in how many years?
Time: Mean = 12.92 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	3	2	3	1	1	☐	1	☐	☐	☐	☐	1

Theme #6: Flexibility in School Facilities.

The schoolhouse can no longer be thought of as a group of rigid spaces that do not change. Instead schools are places where activities change daily and therefore space and equipment must change also. In addition, most school structures are built for a lengthy lifespan whereas technology and society are changing at a rapid rate. Future facilities must be capable of adapting to these changes.

Programming Considerations:

- An increasingly changing society makes it difficult to forecast future needs, therefore facilities should be designed around the principles of flexibility and adaptability.

- Facilities should be planned for the maximum use of technologies not just one technology. Designers must plan for ever changing (and yet unforeseen) technologies.

- Areas with radical fluctuations in enrollment may consider the use of modular classroom facilities which can be added or removed based upon need (these should not be confused with converted mobile homes).

- A need may exist for office space for scheduling and organizing relevant educational experiences correlated with the resources of the community (libraries, museums, concert halls, research facilities, health centers, research and production facilities.

- The notion of "standard" sized classrooms placed on both sides of a long hallway in the traditional "egg carton" fashion will give way to a variety of classroom shapes, sizes and furnishings. This variety will be enhanced by movable walls and utilities to facilitate changing group structures for learning.

Probability of the above considerations being widely accepted:

6___Highly probable. Will unquestionably occur.
5___Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
___ Highly improbable. Will unquestionably not occur.

The above considerations will become widespread in how many years?
Time: Mean = 11.25 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	4	3	1	1	2	☐	☐	☐	☐	☐	☐

Theme #7: Electronic Media in Curriculum, Instruction and Assessment.

Classrooms of the future will be equipped with a variety of technological equipment in very flexible classroom arrangements so that learning groups can be involved as individuals or pairs at times, can move into small group activities of many types, can communicate with a resource center in the school or to anyplace in the world. The emphasis will be on using technology as a learning tool, rather than technology as a subject matter.

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- *Schools should incorporate a variety of technologies, not just one specific technology as in "fiber optics." The challenge will be will be to design facilities for the delivery of the educational program, of which technology may be one of the mediums to enhance the process.

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- Electronic media has the potential to link classrooms across the state, nation or even the world. However, the geometric advancements in technology make it imperative for schools to consider adaptability, flexibility, suitability, adequacy and efficiency when discussing the use of technology in the classroom.

Probability of the above considerations being widely accepted:

6___Highly probable. Will unquestionably occur.
6___Probable. A strong possibility that it will occur.
____Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____ Highly improbable. Will unquestionably not occur.

The above considerations will become widespread in how many years?
Time: Mean = 12.27 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	3	7	☐	☐	☐	☐	☐	☐	☐	1	☐

Theme #8: A Variety of Instructional Methods and Strategies.

We would expect our medical doctors to treat their patients with the latest techniques and prescriptions known to modern medicine. In turn educators should be expected to use the most modern and research proven instructional strategies with their students. The lecture method of teaching, which has been a mainstay of education for centuries, is being supplemented by more recent knowledge in individualized and group instruction, learning styles of students, team teaching and cooperative learning.

Programming Considerations:

*The role of the teacher will be predominantly that of facilitator. As a facilitator, teachers must have ready access to planning or preparation areas, access to a variety of technology in their office and instructional areas, and access to support space for conferencing, volunteers and storage.

*Interdisciplinary team teaching would be facilitated by common support/ planning areas and common planning times during the day.

*A variety of instructional groupings must be facilitated including individualized, cooperative teams or groups, whole class and interactive distance learning. If instruction is truly individualized, multidisciplinary and multi-age grouping may occur. This implies individual study spaces, small group areas, seminar spaces and large open areas all of which may be reconfigured or modified as needed. In addition, individual and small group storage space will be required.

*As instructional environments and instructional methods vary with need, it is important that adequacy, access to and location of technology be considered. Regardless of the configuration, students and teachers must have access to technology (electrical access, interactive video, network data or some as yet undiscovered technology). In addition, the ability to upgrade or add new technology to the instructional environment should be considered.

*The flexibility of instructional grouping must be matched by equal flexibility and adequacy of electrical and computer/interactive television network connections. These connections must be numerous enough and well placed so as to permit walls and furniture to be moved as needed.

*Artificial lighting, climate control and sound absorbing wall, ceiling and floor materials will be desirable in all classrooms, particularly those involving computers and interactive television technology.

Probability of the above considerations being widely accepted:

6___Highly probable. Will unquestionably occur.
6___Probable. A strong possibility that it will occur.
___Somewhat probable. A weak possibility that it will occur.
___Somewhat improbable. A weak possibility that it will not occur.
___Improbable. A strong possibility that it will not occur.
___ Highly improbable. Will unquestionably not occur.

The above considerations will become widespread in how many years?
Time: Mean = 11.67 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	**1**	**3**	**4**	**1**	**1**	**2**	☐	☐	☐	☐	☐	☐

Theme #9: Teacher Planning and Professional Development.

Schools are responding to a need to graduate students who have demonstrated through outcomes assessments that they can produce. To facilitate this teachers will have to become more knowledgeable about research in effective teaching strategies and then work with other teachers in defining appropriate instructional methods and outcome assessments. In essence the role of the teacher will become that of facilitator.

Programming Considerations:

- Teachers will need improved office areas with electronic media access where they will be able to personally review research, study and plan.
- Teachers will need areas where small groups of teachers and entire faculties can meet cooperatively to learn and plan programs. This cooperative planning may be interdisciplinary at times, other times departmentalized.
- Through interactive television links to colleges, universities and state agencies, continuing professional education for teachers (inservices and graduate school) will be as accessible as their own classroom.

Probability of the above considerations being widely accepted:

4___Highly probable. Will unquestionably occur.
7___Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____ Highly improbable. Will unquestionably not occur.

The above considerations will become widespread in how many years?
Time: Mean = 12.50 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	1	3	5	1	1	☐	☐	☐	☐	☐	1	☐

Theme #10: Financing Future Facilities.

The financing of future educational facilities may not have a large impact on the educational specifications. However, it may effect the size of the facility and the quality of construction.

Programming Considerations:

- Given the trend of diminished financial support for education and if the facility is designed to only house the educational program, then the facility will probably be of the "bare-bones" variety.
- If the facility is designed to be a community center which houses a variety of service agencies and the educational program, then the design of the facility and the quality of furnishings and systems will be more substantial based upon a larger, shared financial base.

Probability of the above considerations being widely accepted:

2___Highly probable. Will unquestionably occur.
7___Probable. A strong possibility that it will occur.
3___Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
___ Highly improbable. Will unquestionably not occur.

The above considerations will become widespread in how many years?
Time: Mean = 8.33 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	4	2	3	1	1	1	☐	☐	☐	☐	☐	☐

Theme #11: Special Education.

The movement in special education is towards the inclusion of special needs students in the regular classroom. These students may have larger space requirements than the regular student and could require the assistance of additional staff.

Programming Considerations:

- The movement in special education is towards the inclusion of special needs students in the regular classroom. The implications for facilities may be larger spaces for general instruction (approximately 10-15% larger).
- Conference and office areas will be necessary for meetings and IEP development (Individualized Education Program).
- Consistent with current requirements for special needs students, ramps and elevators will take the place of stairs in buildings with elevation changes.
- Support staff may need work and planning areas.

Probability of the above considerations being widely accepted:

6___Highly probable. Will unquestionably occur.
3___Probable. A strong possibility that it will occur.
3___Somewhat probable. A weak possibility that it will occur.
____Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____ Highly improbable. Will unquestionably not occur.

The above considerations will become widespread in how many years?
Time: Mean = 8.64 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	2	5	2	☐	1	☐	1	☐	☐	☐	☐	1

Theme #12: The Multi-Location Multi-Media Educational Experience.

In the future it is likely that a stronger link will exist between the resources of the school, community and industry. Students may have physical or electronic access to community resources such as libraries, museums, concert halls, colleges, government centers, retail establishments, health centers, and research and production facilities. In turn, when industry needs people with new skills the school will respond with re-training programs or facility access.

Programming Considerations:

- Additional learning opportunities may be available through a home-school-industry-world technology connection. This connection is at present predominantly voice, video and data (predominately computer), but could include interactive video or more advanced technologies in the near future. This home learning environment will not supplant the school (socialization and culture is still an important function of the school) but will supplement the school's learning environment. The implications for schools (and homes) are multi-media or hyper-learning areas, decisions on types of technology (or even standardization of technology) and the appropriate access connections (fiber optic, cellular, electrical, etc).

- Industry re-training will be assisted at the local level by physical or electronic access to the school (conference or classrooms, interactive television rooms, computer access). Interactive, multimedia technology in the schools or even at the industry site may provide the networking capability for large scale, multi-site re-training.

- Students in the future are likely to gain additional education and experience off of school grounds by visiting community and industry resources. The implication for schools might be office space for coordination of activities.

Probability of the above considerations being widely accepted:

2___Highly probable. Will unquestionably occur.
8___Probable. A strong possibility that it will occur.
1___Somewhat probable. A weak possibility that it will occur.
1___Somewhat improbable. A weak possibility that it will not occur.
____Improbable. A strong possibility that it will not occur.
____ Highly improbable. Will unquestionably not occur.

The above considerations will become widespread in how many years?
Time: Mean = 15.83 years

Frequency Distribution of Round One Responses

Years:	TODAY	5	10	15	20	25	30	35	40	45	50	NEVER
Responses:	☐	☐	7	2	2	☐	☐	☐	☐	☐	1	☐